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THE RAILWAY GAZETTE

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French Railway Losses

THE heavy financial losses which have accrued to the French National Railways have caused perturbation to the French Government for some while. The S.N.C.F. budget deficit is approximately £21,000,000, and the Minister of Public Works & Transport has been anxious to achieve some improvement in the railway position before the forthcoming Parliamentary debates on the general financial situation. One unfortunate outcome has been the replacement of M. Maurice Lemaire, the General Manager, a well-known railway officer of long experience. M. Lemaire is stated to have pointed out that he was in no way responsible for the financial administration of the French National Railways. On the other hand, in present circumstances, there can be little doubt that the financial position of the railways is of political importance to the Government. All too often political considerations must weigh in matters affecting nationalised industries. Because of the importance of railways to any national economy, they are particularly prone to political interference in a socialised State. In Great Britain a position may well be reached before very long in which a deficit on State-owned transport may attract a greater measure of Government attention than did the financial wellbeing of the old railway companies. There is no indication, as yet, as to when the first accounts of the British Transport Commission will be published, except that it has been stated that they will be available some time this summer. It is generally expected, however, that these accounts will show a deficit at least as large as that of the French railways.

Industry and the Nation

Some outspoken comments on Government industrial policy were made by Sir Frederick Bain, the retiring President, at the annual meeting of the Federation of British Industries on May 11. He said that the nationalisation of a great basic industry such as steel, vigorous in its plans for development, efficient in its conduct, alive to the needs of scientific research, and enjoying harmonious relations between its managers and its workers, affected the wellbeing of our whole economic life. Those in favour of nationalisation argued that they had to have in their own hands unfettered control of industries and services basic to the economic life of the country. Privately-owned industry was fully alive to its national responsibilities. Unless and until privately-owned industry could be shown to have failed the nation, in the country's present critical and economic condition it was courting disaster to confuse men's minds by threats affecting their life's work, and to disturb a mechanism which had served the country well in war and in reconstruction. Today it was vital to exercise ingenuity, to react flexibly to quickly changing circumstances, to show energy and speed in judgment and action. These were the qualities of private enterprise, and not of slow-moving State organisations.

R.H.A. Liaison with B.T.C. Executive

The first meeting of the Road Haulage Liaison Conference took place in London on May 11. The Conference proceeded with the establishment of the new liaison machinery, which will consist of a Road Haulage Liaison Committee, comprising two representatives each from the Railway and Road Transport Executives, one from the Docks & Inland Waterways Executive, and seven from the Road Haulage Association. This committee will discuss matters of common interest, including matters remitted to it by the Road Haulage Liaison Conference, or which have been the subject of report by sub-committees. Reporting to the Road Haulage Liaison Committee will be two sub-committees. The first will cover rates, conditions of carriage, and other commercial matters. The second will take over the work of the former Central Licensing Sub-Committee, which was part of the Road-Rail Central Conference machinery. Reporting to the Licensing Sub-Committee of the Road Haulage Liaison Committee there will be the existing Regional Negotiating Committees (Licensing). The Road Transport Executive will participate in the work of these negotiating committees, thus regularising the informal participation which has been taking place. A Divisional Liaison Committee will be set up in the territory covered by each Road

Transport Executive Division, and each committee will comprise eight representatives, collectively, of the Executives, together with a similar number of Road Haulage Association representatives.

Railway Pensions

The House of Commons discussed the position of railway pensioners on an adjournment debate on May 10. Sir John Mellor, Conservative Member for Sutton Coldfield, who raised the matter, drew attention to the hardship suffered by pensioners because of the increased cost of living. He said that there were about 10,000 men in the age group who had retired before July, 1941, and they were the worst sufferers. Only those whose pensions were less than £135 a year had received any compensation for the increase in the cost of living. On the other hand, supplementary cost-of-living pensions had been granted to retired army officers with a ceiling of £600, and the lot of retired civil servants also had been improved. The Minister of Transport did not encourage hopes that the position might be reviewed for railway pensioners. The British Transport Commission had inherited the railway companies' superannuation schemes. There were approximately 99,000 persons covered by them and there were 32,000 drawing superannuation annuities. These superannuation schemes were not solvent. In 1947, payments made by the railway companies amounted to £4,187,000, of which the deficiency payment from the current revenues of the railways was £2,542,000. The general finance of the railways under the British Transport Commission's administration did not permit of the imposition of additional burdens of that kind.

European Transport Systems

M. Raoul Dautry, one-time General Manager of the French State Railways, and subsequently a Director of the French National Railways Company, became French Minister of Reconstruction after the war, and it is as former holder of this office that he contributed an article to *The Times* recently. The high reputation which M. Dautry enjoyed as a railwayman will ensure careful reading of his comments on the existing transport systems in Europe even by those who do not share some of his views. He points out that the railways are now nationalised throughout Europe and that the road services have developed tremendously. He goes on to suggest that "it is essential and possible to do away with all uneconomic railways." He is convinced that in the Western Region of France, for example, only the lines from Paris to Dieppe, Rouen and Le Havre, Caen, Cherbourg, Granville, Brest, Nantes, and la Rochelle, and the connection Caen—Le Mans—Tours should be retained if the French Railways are to balance their budget. Rail services are dearer and less patronised than road transport for distances under 90 miles, except for large consignments, and he argues that the costs of parallel and insufficiently-used means of transport weigh heavily on agricultural and industrial prices. M. Dautry's cure is drastic. It would have political, economic, and strategic implications.

Has the Peak in American Engineering Costs Passed?

It is significant that in America engineering constructional costs appear to have remained stationary since last autumn, instead of having continued to rise as expected. Is this merely a hesitation in the upward trend or is the peak passing? There seems no doubt that this steadiness in costs is due to a combination of circumstances reacting on one another. These are the stabilisation in costs of labour and materials, and increasing competition, as well as an increase in the labour market and in labour productivity. As a result, lower tenders are forthcoming from contractors, especially for jobs likely to take some time to complete, because they at last feel justified in reducing the allowances in their own estimates for contingencies, hitherto amounting to 20 and more per cent., to cover probable rises in costs of materials and labour. Tenders, in fact, are falling below engineering constructional estimated figures for the first time in years. There is now some prospect that costs will remain steady or tend to fall for at least two years, and this expectation already is producing keener competition, so completing a happy if vicious circle.

The Locos Summer Meeting

Speaking at the annual dinner of the Institution of Locomotive Engineers, which was held at the Midland Hotel, Manchester, on May 11, Lt.-Colonel Harold Rudgard, the President, stressed the importance of the Institution's summer meetings. Great store had been set on these meetings, and Colonel Rudgard said he considered the decision to hold the first since the war at Manchester, had been a wise one. As will be seen from our summary of the meeting, which appears elsewhere in this issue, the success of the comprehensive programme arranged owed a great deal to the collaboration of the Railway Executive, Beyer, Peacock & Co. Ltd., The English Electric Co. Ltd., and Metropolitan-Vickers Electrical Co. Ltd., in the provision of visiting and other facilities. Not only in providing opportunity for instructive observation of different production methods, but in making possible personal exchanges of experience and ideas, the meeting proved its value to the considerable body of members participating. Impressive performance was not confined to the 500 m.p.h. display of a "Vampire" jet aircraft, but was equally manifest in British Railways demonstrations of modern motive power with the Caprotti valve gear Class "5" locomotive and the diesel-electric No. 10000.

Lightweight Metals in Locomotive Construction

The advantages of aluminium and lightweight metals in the construction of locomotives and rolling stock are described in an illustrated article on page 553 of this issue. One of the most interesting examples cited is that of a gross saving of 8,899 lb. in the weight of an articulated double-end locomotive. If steel had been used for the crossheads, connecting and coupling rods, valve gear, tank and tank brackets, lubricator pipes, footsteps, platforms, clothing sheets, and lagging, the total weight of these components would have been 18,208 lb.; the use of aluminium reduced this figure to 9,309 lb., a saving of no less than 49 per cent. It is also estimated that the use of aluminium for the cab, decks, running boards, steps, handrails, sandboxes and sandpiles, casings, and smoke deflectors of the New York Central Railroad's "Niagara" 4-8-4 steam locomotives, saved a total of some 6,000 lb. dead weight, while passenger coach body sections built of aluminium sheets and sections can show a saving of about 50 per cent. in weight without any loss of structural strength. The alligator crosshead, piston, and piston rod assembly illustrated on page 553 is constructed of high dynamic steel with forged aluminium shoes. The complete assembly, including the tubular piston rod and special lightweight piston, is stated to weigh only about 48 per cent. of a normal unit of similar dimensions.

Multiple-Unit Train Performance

Much evidence of interest in the performance of electric trains has followed publication of our articles in recent years on Southern Region Brighton line running. These have emphasised the consistency of electric operation, but dealt mainly with relatively long point-to-point journeys. It is on the very short inter-station runs of suburban working that this method of traction contrasts most effectively with the steam locomotive. There is not a great deal of up-to-date literature on this subject available, although developments in electric traction lend new point to such comparisons. A contributor to this issue analyses the performance to be expected from the latest types of electric multiple-unit stock, such as will be used on the Liverpool Street to Shenfield and Manchester to Glossop lines of the Eastern Region when electrification is inaugurated, and compares the running on certain parts of the former route with an estimated performance of a typical steam suburban locomotive. Not only do the acceleration and saving in time with electric traction show their expected superiority in all circumstances, but the ample margin of tractive effort available for acceleration over that required for propulsion against an adverse gradient, is a prominent feature of the electric train performance. A further comparison in the article, of tractive effort against weight of motive power equipment, shows another direction in which the steam locomotive is on anything but even terms with the multiple-unit train.

Diesel Locomotive Crews

The conclusions of an emergency fact-finding board appointed by President Truman at the end of January are likely to have a considerable influence on the future operation of American main lines. Its appointment arose from a demand by the Brotherhood of Locomotive Engineers that all diesel locomotives of 1,000 b.h.p. or over should carry a second driver. The railways refused to accept the services of the National Mediation Board to settle the dispute, and the President's action forestalled a strike of enginesmen which had been called for January 31 on 18 of the principal railways in the Western States. Since then the Brotherhood of Locomotive Firemen & Enginemen has put in a similar demand that all diesel locomotives in road service, even single units, shall carry a second fireman or helper. Acceptance of both demands would mean a crew of three on each single-unit diesel, and of four on every multiple-unit locomotive. Such an increase of operating costs would upset the whole of the economic structure whereby the almost unlimited availability and the cheap fuel costs of the diesels are balanced against their heavy capital cost, which in the case of the latest quadruple-unit diesels of 6,000 b.h.p. amounts to between \$600,000 and \$700,000 a locomotive, or roughly twice that of a steam locomotive of comparable power. The results of the inquiry are therefore awaited with no small concern, especially by those railways in the U.S.A. which now are mainly if not wholly dieselised.

Railways and Trade Cycles

IN 1920, the National Bureau of Economic Research was set up in the United States to ascertain and present to the public important economic facts and their interpretation. Many American universities and business organisations are associated with the Bureau's work, which is conducted in a scientific and impartial way by a skilled research staff under the direction of Mr. Arthur T. Burns, of Columbia University. For some 25 years, a special study of business cycles has been in progress—a subject of great importance to all classes of the community in America and elsewhere. As one part of this enquiry, Mr. Thor Hultgren has examined the unique statistical records of U.S.A. railways from 1882 to 1938, with the object of weighing-up the influence of business cycles on the policy and operations of the railway companies. Equally complete details do not exist for other types of transport, but the available statistics have been probed carefully. The results of the whole investigation have been published recently in a book entitled: "American Transportation in Prosperity and Depression."*

It is impossible not to admire the industry that has prepared this volume of nearly 400 pages. The text comments at length on 151 statistical tables, together with 133 charts showing trends of development over selected periods of 20 years or more. The author has had a varied experience as an economic and statistical analyst, including 3 years' service with the Interstate Commerce Commission. His remarks on the mass of figures passed under review are clear and incisive, though, in places, there is a tendency to elaborate the obvious. Statistical analysis hardly is needed to show that, in prosperity, profitable use can be made of wagon stock and big wagonloads secured, whereas there is a good deal of empty movement and storage of surplus wagons in hard times. Again, it is evident that privately-owned railways will be inclined to defer maintenance of equipment, permanent way and structures during a trade slump. Between 1930 and 1934 British railways cut down expenditure on maintenance and renewals somewhat ruthlessly.

Mr. Hultgren has taken great pains over two chapters which aim at breaking fresh ground. The first, headed "Prices and Wages" deals with railway rates and fares, as well as prices paid for equipment and materials; the second discusses changes in costs and profits. Much ingenuity is displayed in marshalling facts and figures to reach the conclu-

sion that profits normally are higher at the end, than at the beginning, of cyclical expansions in traffic, and usually are lower at the end, than at the beginning, of contractions.

The book closes with a forecast of the effect of future trade cycles on transport—for the author thinks the probability is that the procession of expansions and contractions will continue. If business activities fluctuate over long periods, railways, in his opinion, will go through much the same experiences as in the past, though developments on the part of air, road, water and pipeline carriers may modify the distribution of the country's volume of transport among the various agencies.

Track Formation Improvement in Holland

THE main line of the Netherlands Railways from Utrecht to Rotterdam and the Hague passes through an area of waterlogged peat moor and low-lying reclaimed land, which is typical of this part of Holland. The task of maintaining a satisfactory formation on such an unstable foundation has always been one of considerable difficulty and expense, and serious subsidences have occurred on several occasions. Between Oudewater and Gouda there is a particularly bad section, nearly seven miles in length, on which extensive improvements, to increase the stability of the track, are now being carried out. At the invitation of the Netherlands Railways Company, a party of members of the London Section of the Permanent Way Institution recently travelled to Holland to inspect these works. The technical problems involved were outlined in a lecture by Hr. J. L. A. Cuperus, Chief Civil Engineer, before the visit to the site.

The railway was built in 1855, and the embankments were constructed from the material excavated for the formation of drainage ditches. The track was ballasted with sand to a depth of 1 ft. 8 in. The soft peat subsoil, which varied in thickness from 20 ft. to 36 ft., was completely saturated, and it was impossible to prevent the embankment from subsiding. Moreover, the track sagged under the weight of passing trains. For many years, the subsidences were made good with additional layers of sand ballast, but after 1900 gravel was used. This continual raising of the track increased the weight superimposed on the moorland, and in 1930 a section of the embankment at Nieuwerkerk suddenly subsided into the peat to a depth of 10 ft. In this case, the railway was restored by the construction of coffer-dams, filled with sand, on each side of the embankment. This arrangement proved entirely satisfactory, but was very expensive.

Two methods were devised to increase the strength of the formation on the remainder of the unstable section between Oudewater and Gouda. The first method provided for the construction of two dams of sand, which completely enclosed the embankment. Large quantities of sand were deposited quickly, and the weight of this material pushed the semi-liquid peat aside. In the second method, the sand was deposited gradually, so that the peat became more compact, and less likely to move. In 1938, experiments were made with both methods over a length of $\frac{1}{2}$ mile, in the worst part of the section. These tests indicated that the first method usually gave the better result, although it was more expensive, and the risk of serious disturbance of the track was always present. However, subsequent tests showed that it was not completely reliable, as the peat was not always pushed aside.

It was therefore decided to adopt the second method. This results in greater subsidence of the track after the sand has been deposited, but the total cost of the improvement is less, despite the need for additional subsequent maintenance. By the time the strengthening of the embankments had been completed, in July, 1948, well over 1,000,000 cu. yd. of sand had been used.

The work of improving the stability of the track is now being undertaken. On some sections, a widening of the embankment, to spread the load, is sufficient, but, where the subsoil is particularly soft, additional strengthening of a novel type is being provided. The top of the embankment is removed and replaced by a reinforced layer of fine sludge slag. In course of time, this slag hardens into a substance resembling concrete. A layer of sand is placed between the top surface of the slag and the gravel ballast. Some $5\frac{1}{2}$ miles of double track are to be strengthened in this way, and about two miles are now

* "American Transportation in Prosperity and Depression." By Thor Hultgren. New York, U.S.A.: National Bureau of Economic Research, 1819, Broadway, New York, 23. 9 $\frac{1}{2}$ in. x 6 $\frac{1}{2}$ in. x 1 in. 397 pp. Price 55

nearly completed. When the reinforcement has consolidated, the track is to be relaid with heavier rails, and rebalasted with stone. On the completion of these works, trains will be allowed to pass over the line at speeds approaching 80 m.p.h.

Electric Motive Power from a New Viewpoint

A NEW and most interesting line of thought in connection with the characteristics of electric locomotives has been taking shape in the U.S.A., and has been crystallised in a paper* recently delivered by Mr. A. H. Candee, of the Westinghouse Electric Corporation, at the winter general meeting of the American Institute of Electrical Engineers. In the past, the tendency rather has been to separate the various forms of railway motive power into different groups or categories; thus, the design characteristics of the electric locomotive were thought to be solely those which had become established through some fifty years' use of overhead-electric, or third-rail electric machines. The last twenty-three years, however, have witnessed the widespread adoption, in the U.S.A., of various forms of self-propelled electric locomotives and railcars, so that a case can be made out for the development of new concepts of the design, layout, capacity, limitations, and advantages of electric motive power for railways.

Mr. Candee regards any locomotive whose propulsion is effected by electric motors mounted on it, as an electric locomotive, whether the power is generated on the vehicle, or derived from an external source. Electric locomotives, therefore, include both overhead-distribution and third-rail locomotives, as well as petrol-electric, diesel-electric, steam-turbine-electric, gas-turbine-electric, and battery locomotives. In their early development, the term "electric" purposely was deleted by the builders of diesel-electric locomotives, which claimed that the electrical equipment was merely a transmission system and of secondary importance to the diesel engine, to which it was a convenient, but not entirely essential, accessory. However, experience has shown that many of the desirable characteristics of this form of motive power directly are attributable to the electric propulsion system, and these same features are to be found in the steam-turbine-electric, gas-turbine-electric, or any other self-propelled vehicle having electric drive. In fact, Mr. Candee says that diesel motive power would be highly impractical for railway use, if it were not for the electric equipment, as he contends there is no other torque-converting means with the same wide range of application.

The advantages of the electric locomotive, as compared with the reciprocating steam type, are its high tractive effort at starting; high power availability at low train-speeds; smooth, non-pulsating tractive force. These features particularly apply to geared electric locomotives. When the wheels are driven through side rods, there may be a fluctuation in the distribution of tractive force, which will reduce the adhesive value correspondingly, and Mr. Candee feels that electric drive through side rods should be avoided wherever possible and geared drive used instead. The connecting-rod and side-rod drive, moreover, is limited in its application, for if more than four pairs of driving wheels are required, the rigid wheelbase tends to be over-long, as all the driving axles must be contained by a rigid frame. Such limitations are not present in a geared electric drive, for traction motors may be applied to as many driving axles as may be found expedient.

As a guide to the usefulness of a locomotive, the tractive force is of greater value to the railway engineer, than the horsepower which it can develop, because (assuming always that a reasonable power output can be attained) high tractive-forces for starting and acceleration are of more importance than high power, which can be developed only when operating at high train-speed. This is one reason why the diesel-electric locomotive, because of its electric drive, has found favour.

The inherent disadvantage of a mechanical drive from prime mover to axles is its liability to severe stresses and mechanical shocks, which limit its application. With an internal-combustion engine as prime mover, the engine must be kept running all the time, even when the locomotive is stopped; a clutch is essential, therefore, and, in addition, means must be provided for augmenting the engine torque in inverse proportion to the

locomotive speed. When to such inevitable complications are added the driving of multiple wheels, or axles, the mechanical difficulties and maintenance costs are great, and make this type of drive unsuitable for all but the smallest locomotives.

In a power transmission system, the desirability of being able to drive any number of axles without complication is a powerful argument in favour of individual axle drive. Though the hydraulic drive (a pump and one or more fluid motors) fulfils this requirement, the conduction of a large volume of liquid under very high pressure from the pump to the hydraulic motors driving the individual axles, becomes a major problem; in Mr. Candee's view, it has been found quite impractical. He thinks, too, that the fluid torque converter, which is not adaptable for individual axle drive, has most of the disadvantages and complications of any mechanical transmission.

High axle loading has characterised reciprocating steam-locomotives, because of the difficulty in obtaining a sufficiently high tractive effort to suit a limited number of driving axles. Using electric drive, however, still higher tractive effort can be obtained with low axle loadings, with corresponding benefit to the track, especially in connection with the reduction of the number of complete rail fissures, which have resulted from rail-head shatter cracks.

The rating of electrical machinery is based on the safe current which can be carried without exceeding a certain temperature. There is also a time factor, due to the period required by the generators and traction motors to reach the specified temperature. Of course, if large enough generators and motors were installed, no operating conditions could arise which would cause them to exceed their safe temperature limit, but considerations of cost, weight, and overall dimensions oblige engineers to keep to a size which is practicable commercially. In overhead-electric and third-rail traction, schedules, gradients, and tonnages, are fairly well defined, but self-propelled locomotives have to work under a wide range of operating conditions.

Electric motive power has changed since the advent of self-propelled electric locomotives. Where high horsepower per axle was once aimed at, the desirability of such construction is now questionable except for special-purpose machines. Almost all modern electric motive power is being built with low weight and low horsepower per axle; the number of axles is increased to suit the power required. The direct-current axle-hung motor with single-reduction spur gear is satisfactory for any type of self-propelled electric locomotive and for all classes of service. The release of the electric locomotive from the confines of electrified tracks by the addition of one or more prime movers has disclosed operating characteristics which could not be utilised fully under previous operating conditions. Finally, the production of standardised designs of self-propelled locomotives has resulted in great savings to the railways, and it is being found entirely practicable to fit the services to the capabilities of the standardised locomotives, instead of making locomotives to suit the services. In Mr. Candee's opinion the electric locomotive, long thought to have reached its zenith, is again leading the way towards improved rail transportation.

Urban Passenger Transport in Europe and U.S.A.

IN 1948 Colonel S. H. Bingham, a Commissioner of the Board of Transportation of the City of New York, inspected passenger transport undertakings in London, Paris, Stockholm, and elsewhere in Europe. In his report* to the Mayor of New York he praises the morale of European, including German, railwaymen, and the vigour displayed by European railways in difficult post-war conditions. He comments favourably on the equipment of London Transport railways, especially on speedway control of escalators (which move, incidentally, at twice the speed of those in New York) and on the controls at the disposal of motormen and guards. He gives a detailed description of the new Stockholm underground as embodying experience gained from the older systems of Europe and America. He concludes by reviewing the ingenious parking and other regulations framed, if not to abolish, at least to palliate road traffic congestion in London.

On his return from Europe, Colonel Bingham examined the

* "The Renaissance of Electric Motive Power," read by Mr. A. H. Candee, of the Westinghouse Electric Corporation, before the Winter General Meeting of the American Institute of Electrical Engineers, January 31-February 4, 1949

* Report of Inspection, European Transit Systems, Summer of 1948

passenger transport problems of San Francisco. His solution, outlined in his report* to the Mayor, is a "rapid transit" system, though this would be considered in this country to be a standard urban electric railway. He points out that street traffic congestion in the centre of the city has become intolerable. He is therefore opposed to any step which will increase the number of road vehicles, of whatever description, such as the building of express highways, which in his apt metaphor "funnel more and more cars into the limited downtown areas of a city." The motorist, as in most American cities, aggravates congestion by being the sole occupant of his car during the business rush-hours. He must be tempted to travel by electric railway, not only to swell revenue, but also to lessen street congestion for the good of the whole community. The electric railway service therefore must be swift and frequent, and there must be ample car-parks at stations in or near residential areas.

The business centre of San Francisco lies to the north and north-east end of the peninsula separating the Bay of San Francisco on the east from the Pacific Ocean on the west. Colonel Bingham's programme envisages three lines from the centre of the city, largely in tunnel, to the suburbs to the west and south. Provision is to be made for eventual integration of these lines with electric lines crossing the Bay to its eastern shore by the famous Bay Bridge. He insists on a railway, as opposed to a tramway running in tunnel, on two main grounds: only a railway operating eight-coach trains with a crew of two, as opposed to a single or two-car tramway unit with the same crew, can sufficiently keep down operating costs; and the cost of building a tunnel for trolley tramcars may be higher than a tunnel of smaller dimensions for third-rail electric railway trains. He considers nevertheless that traffic will not at first justify trains of more than five cars; stations therefore should be built accordingly, with provision for subsequent enlargement to take eight-car trains. Stations, about three to the mile, are to have island platforms. Those on the underground sections should have mezzanine booking halls with access to street through buildings adjacent to the street; direct entrances from the sidewalk make for street congestion, and should be avoided. At interchange points with bus and tram routes, suitable off-the-street transfer facilities are to be provided, so that buses and trams will not interfere with street traffic during loading and unloading; if space permits, there should be storage space for such vehicles during slack hours, so as to minimise redundant bus and tram mileage. All junctions are to be burrowing. The projected service is one of, at first, four-car trains every four minutes, giving an overall speed of 16 m.p.h. and a reduction of one-third in the present journey times of tramcars. Colonel Bingham advocates a ten cent (at the present rate, sixpenny) uniform fare, with the right of transfer to or from bus or tram. The distances involved justify the free transfer privilege, and the charging of an additional fare for a transfer would lead, he considers, to a demand for the retention of through surface transport to the congested central district of the city.

* "Long-Range Rapid Transit Program for San Francisco," February, 1949

Ages of Locomotive Drivers in Switzerland

THE results of a recent survey of the ages of drivers on the Swiss Federal Railways has been published in *Nachrichtenblatt*, the organ of the railways. It shows that the number of drivers engaged on the driving of the various types of locomotive and railcars is approximately 2,000. Enquiries were made as to the ages of drivers on the books of the S.F.R. in selected years—1913, 1924, 1934, 1945, 1948. The results are shown graphically. For each year of age from 28 to 65 (horizontally) is given, vertically, the number of drivers during the year in question. The points so determined are linked by a curve, one curve for each of the five years under consideration. Thus, in 1913 there were 65 men aged 35, or in 1924 89 men aged 50, and in 1948 50 men aged 60.

What significant conclusions can be drawn from the five curves? It is, more than anything else, surprising that in 1913, with exclusively steam operation, the greatest number (75 per cent.) of drivers were aged 35 to 45. There were few men over 50. Only one was 60. Only about 8 per cent. of all men were of 50 years or more. Today the distribution by age groups is much more even. The 2,000 drivers are divided into age groups as under:—

	Per cent.
28-40	approx. 20
41-45	15
46-50	19
51-55	15
56-60	16
61-65	15

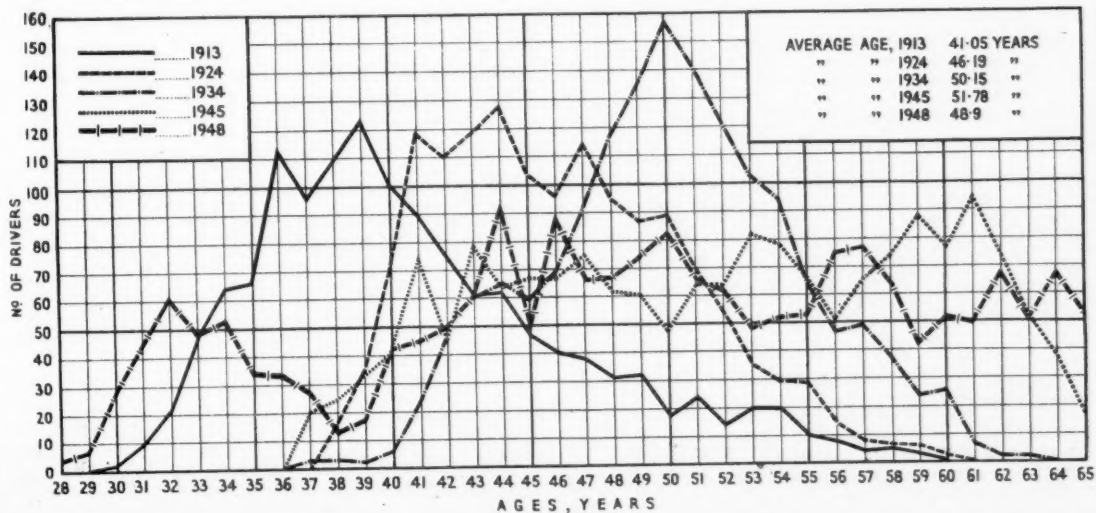
In other words, men of 65 are represented as strongly as their younger colleagues—a welcome tendency both for men and management. Every man can look forward today to retiring on pension at 65, whereas formerly premature retirement was usual. This tendency can be attributed to the following factors:—

1. Reduction of the working day from 11 to 8 hours in accordance with the Labour Law of 1920.
2. Electrification of most lines and reduction of sickness due to steam locomotive footplate duties.
3. Improved social conditions.
4. Healthier habits, which have lengthened the life of the whole community.
5. Decline in consumption of alcohol.

For each of the five years under consideration the average age of locomotive drivers is:—

1913	41.05
1924	46.19
1934	50.15
1945	51.78
1948	48.90

Owing to the fact that over 300 young drivers' assistants have been promoted to drivers in the last three years, the S.F.R. now have achieved normal, healthy conditions concerning the age of their locomotive drivers. This is clear from the 1948 curve in the graph below.



LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Locomotive Cylinder Design

Carl Side, Portinscale,
Keswick, Cumberland. May 10

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In line 21 (reading upwards from the bottom of the column) of the middle column of my article on Locomotive Cylinder Design, part 2, page 466, I find the decimal point for the value 0.7 should have been one place to the left, making the figure 0.07. I can only assume this has been a typing error which has slipped through unnoticed.

As it happens, it concerns a section which very few railways—if indeed any—are interested in today, namely, the cylinder with flat slide valve, but locomotives for steel works and collieries still use this type of valve, since saturated steam is their operating medium.

Yours faithfully,
GEORGE W. MCARD

Superannuation and War Bonus

30, Rawsdale Crescent, Sherwood,
Nottingham. May 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—During the last war *The Railway Gazette* took up the case of those railway officials who were not considered eligible for the War Bonus. This was successful and was greatly appreciated, as it was only through your efforts in pressing this case that we were included.

May I call your attention to the position of those officials who retired before June 30, 1946? Although we had been granted the War Bonus, it was not included in the calculation for our superannuation. This was a serious matter, as in my case we are not eligible for the benefits of the Government Old Age Pension scheme.

This has become more noticeable by comparison with those in employment, as most of the latter are being granted wage increases to compensate for the soaring prices of necessities.

If you could help in this matter I should be grateful.

Yours faithfully,
H. W. HOLT,
late Area Technical Assistant,
L.M.S.R., Signal & Telegraph
Dept., Sheffield

The Paddington-Birmingham Service

The Deanery, Stanley,
Falkland Islands. March 30

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—You have honoured me, as an armchair critic, armed only with *Bradshaw* for September, 1948, by publishing my previous letter on January 28. A compositor's slip—"there" for "these"—rather obscures my suggestion that the through trains from Paddington to North Wales and Chester should run non-stop to Birmingham. In your proposed timetable (October 1 and November 5, 1948, issues) North Wales gets a worse service than in 1939. I also feel that Coventry could have as good a service *via* Leamington (except a slightly longer time); add the connections with semi-fasts at Rugby, and there would be many more trains. I had something like this in mind:—

Paddington ...	8.10	8.40	9.10	9.40	10.10	11.10	12.10
Banbury ...	St.	—	St.	St.	—	St.	—
Leamington ...	St.	—	St.	St.	—	St.	—
Birmingham ...	10.15	10.40	11.10	12.5	12.10	1.10	2.10
		Ch.		SF	Ch.		Ch.
Paddington ...	12.40	1.10	2.10	3.10	3.30	4.10	4.40
Banbury ...	SF	—	—	St.	SF	—	St.
Leamington ...	—	St.	—	St.	Via	—	St.
					Oxford		
Birmingham ...	—	3.10	4.10	5.10	—	6.10	7.5
		Ch.	Ch.	Ch.	Ch.	Ch.	SF
Paddington ...	5.10	5.40	6.10	7.10	8.10	10.10	12.10
Banbury ...	D	—	C	—	St.	SF	SF
Leamington ...	St.	—	St.	—	St.	Via	Via
						Oxford	Oxford
Birmingham ...	7.10	7.40	8.10	9.10	10.15	—	Ch.
		Ch.	Ch.	Ch.	Ch.		Ch.

All trains run to Wolverhampton

St.—stop. SF—Semi-fast. Ch.—to Chester, etc. D.—Banbury slip.
C—Bicester slip forward to Banbury

The semi-fasts would stop at Wycombe or Princes Risborough; Bicester; Banbury; and Leamington. As Warwick gets all the Stratford trains there seems no call for regular stops; on the other hand Princes Risborough, with three branches,

deserves a better service. All stops at Leamington would give connections to Stratford and Coventry. The midday semi-fast might terminate at Banbury, connecting there with one of the through trains from the South Coast to Birmingham. The 10.10 p.m. is the present 9.50 extended. There appears to be an error over your proposed 3.30 semi-fast *via* Oxford, as the time of 2 hr. 38 min. with five stops (presuming Reading) to Birmingham seems optimistic.

I would like to suggest sending the semi-fasts from Penny Compton to Birmingham *via* Stratford. The single line would present no difficulties if the loops allow a reasonable turn of speed, but perhaps sufficiently heavy locomotives could not work that way. Also, could the Ashendon speed restriction be removed by giving preference to the Bicester line? High Wycombe stops would be of more value if there were a connection on the branch for Maidenhead and Slough.

Your remarks about slip coaches are undoubtedly right, but will you agree that there can be exceptions? The cost of stopping the express must be weighed against the cost of staffing the slip. A good service one way is better than a poor one both ways! There is a call for a more "spread out" service from town than to town, and "slips" can supply these extras. This is shown in suburban timetables, the down evening service being more extensive than the up morning one.

The question of access by "slip" passengers to dining cars cuts both ways. It is only necessary on long distances such as the one-time Exeter slip on the 10.30 from Paddington. It might be better that passengers travelling shorter distances were kept out, so that those going a long way could get a better chance.

Yours faithfully,
R. G. R. CALVERT

Locomotive Liveries

9, Berriedale Avenue,
Hove 3, Sussex. May 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Welcome as is the revival of the L.N.W.R. colour on our locomotives, may I suggest that the one flaw is that the lining is confined to the lower half of the cab sides, thus giving a distinctly unfinished appearance?

Were the upper halves of the cab sides also to be lined—as in the old L.N.W.R. practice—it would be, I think, a very considerable improvement.

Yours faithfully,
J. P. BARDSLEY

Passed to You, Please!

Westminster. April 25

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The Civil Service used to play a game with files of papers called "Passed to you, please." Are we going to see the Minister of Transport, and the corporations he has set up, joining in the pastime? According to *The Times* of April 23, London Transport Executive stated that all decisions about passengers standing in buses were made by the Minister, to whom the decisions of a workers' conference would probably be passed. Is the body appointed to conduct the transport of between 80 and 90 million Londoners every week not competent to settle questions of working arrangements with its employees? And what is the British Transport Commission's part in the passing-on game?

Yours faithfully,
CYNICUS

The Russian Railways

7, Audley Road, Ealing,
London, W.5. May 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I am reluctant to pursue further the controversy on Russian *versus* American railway statistics which has arisen from my recent book on "The Russian Railways," particularly as I am in entire agreement with Mr. Bell, who contributed to your issue of May 6 on the subject, that American railway statistics are much more easy to procure and evaluate than Russian figures.

I would point out, however, that I made the comparison of population-railway mileage ratios of Russia and America because the economies of the two countries are sufficiently alike to warrant it. Both have a big industrial and agricultural output, and in both the railways are the main form of internal transport. Neither country properly can be compared with India (or China, which is an even more extreme case, if Mr. Bell had cared to quote it). The industrial and agricultural

output of India and China is immeasurably smaller than that of Russia and the U.S.A.; the standard of living is much lower; and in the case of China, the majority of her internal transport is provided in any case by her extensive system of waterways.

I am afraid, also, that I cannot see where I made the slip regarding American wagon loads of which Mr. Bell accuses me. The figures which I used were taken direct from official U.S. railway statistics. The booklet "Yearbook of Railroad Information" issued annually by the Committee on Public Relations of the American Railroads before the recent war, gives the following figures for all Class I American lines for the year 1937:—

Average freight train load	796 tons
Average number of wagons per train	48
Average capacity per wagon	49 tons
Average load per loaded wagon	27 ..

The only conclusion which can be reached from these official figures is that the average American freight train in that year comprised 19 wagons completely empty and 29 wagons nearly half empty, and that the average wagon load per wagon run (loaded and empty) was only 16 tons. I appreciate that the latter is not a standard statistic, but it does not appear an unfair criterion of the efficiency with which available wagon capacity is utilised.

Yours faithfully,
P. E. GARBUTT

Major Developments in Locomotive Design

The Railway Executive.

222, Marylebone Road,
London, N.W.1. May 6

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with interest the letters dated February 17 and 21, published in your issues of April 22 and 29.

As Mr. Montague Smith, the writer of the letter of February 17, states, it is a matter of opinion what should be regarded as milestones in the development of locomotive design. Dealing with his letter first, I would comment on the six omissions:—

1845—Dial pressure gauge, Sching, in Germany.

The pressure gauge was included in the original text, but was ultimately left out as not wholly applying to the locomotive.

1860—4-4-0 locomotive on the S. & D. Railway. William Bouch.

This wheel arrangement is mentioned under 1849.

1862—Steel boilers used on M. & C. Railway. George Tosh.

Steel fireboxes are mentioned under 1860. A. Allan.

1871—4-4-0 engine with inside cylinders and inside frames. N.B.R.

Gooch had a similar design in 1855 with inside sand-wich frames. This was omitted from text to keep this section within reasonable limits.

1874—Steam reversing gear, G.S.W.R. J. Stirling.

Mentioned in original text but deleted for same reason as above.

1889—200 lb. pressure on Caledonian Railway. D. Drummond.

Caledonian large boilers mentioned under 1897. Drummond's steam pressure of 1889 was only an experiment and cannot be classed as a major development.

Regarding what Mr. Montague Smith states as errors, I have the following remarks to make:—

1832—Steam brake not used until 1833.

Between 1832-33 Stephenson experimented with the buller brake and steam brake.

1846—G.W.R. 4-2-2 built in 1847.

2-2-2 G.W.R. locomotive *Great Western* built in 1846. This engine and remainder of its class built as 4-2-2 locomotives between 1846-55 at Swindon. This information is taken from a list supplied by W. Dean in 1890.

1856—Screw reversing gear, Aberdeen Railway, several years earlier.

This may be the case, but the major development of the screw reverser really arose from the Ramsbottom design.

1859—Brick arches. During the transition from coke to coal burning in the 'fifties of last century various experimental brick arches and other devices were adopted, but there is no dispute that the modern brick arch is developed from that employed by M. Kirtley on the Midland Railway.

1864—Radial axleboxes were first used on the St. Helens Railway in 1863.

The major development of the radial axlebox was from the Adams design in 1864.

1867—Long travel valves. Hull & Selby. 1840.

Beattie's design given priority as having the greater influence in modern design.

1868—Counter pressure brake. South Stafford Railway. 1856.

Admitted. However, first practical effective counter pressure brake system was that ascribed to L. le Chatelier, a French engineer.

1871—Compressed air brake. Caledonian Railway. 1873.

The date 1871 supplied by the Caledonian Railway.

1872—Belpaire firebox. Flat top casing used on S. & D. Railway. 1866.

Further major development was from Belpaire's design.

1874—Ramsbottom used a speed indicator in 1861.

Ramsbottom speed indicator used for experiments with water pick-up apparatus, as 40 m.p.h. was considered to be the most efficient speed for lifting water.

1889—Date of Great North of Scotland eight wheeled tenders. 1890.

Jas. Manson designed his eight wheeled tender in 1889.

1893—Oil fuel. In Russia 1889.

This is a well-known fact, but the date 1893 concerns this country.

1897—C.R. large boiler type. 1896

The improved Dunastair type appeared in 1897.

1903—Hoy's 0-8-0 engines came out in 1902.

Mr. Hughes in his paper to the Inst. of Mech. Engineers on Horwich locomotives during July, 1909, gives the date of fitting the steel corrugated firebox as March, 1903.

1912—Mechanical lubricator—Used before this date.

A few railways used forced feed lubrication before 1912, but the major development of forced feed lubrication in this country arose from the Crewe and Wakefield types of 1912.

Regarding the points raised in "Enquirer's" letter of February 21:—

1912—Whitelegg's Baltic tank.

This was in my mind as the major development.

Billinton's first 4-6-4 was built in 1914.

I have no quarrel regarding the statements about Stroudley's *Gladstone*.

Regarding the tank engines, "Enquirer" makes mention of the Whitelegg and Stroudley engines. Reference was made to other tank engines, but their relationship to express work was not specially mentioned because it was not considered necessary.

If, in the selection made, certain outstanding features, which are in your writers' minds as major developments, appear to have been unaccountably omitted, it should be borne in mind the amount of detail which could be put into an address of this description.

Yours faithfully,
HAROLD RUDGARD

Handling Brighton Holiday Traffic

74, Claverdale Road,
Tulse Hill, S.W.2. May 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Mr. Bond, whose letter appeared in your issue of May 6, may be interested in the following information concerning up trains from the South Coast on Easter Monday evening:—

Haywards Heath:—

	7-7.59 p.m.	8-8.59 p.m.
Trains starting ...	1	7
.. passing ...	16	11
.. stopping ...	6	—
	23	18

Trains from South Coast stations:—

From	Leaving from				
	5-5.59 p.m.	6-6.59 p.m.	7-7.59 p.m.	8-8.59 p.m.	9-9.59 p.m.
Ore—Victoria (direct) ...	1	3	1	—	—
Ore—Eastbourne—Victoria ...	—	—	—	1	1
Eastbourne—Victoria ...	3	2	3	—	—
Seaford—Victoria ...	1	1	—	—	—
—London Bridge ...	1*	1	1	—	1*
Brighton—Victoria (non-stop) ...	4	6	6	7	7
.. (fast) ...	1	—	1	1	—
.. (slow) ...	—	—	—	—	2
—London Bridge (fast) ...	1	1	2	2	—
.. (slow) ...	1	1	1	1	—
West Worthing—Victoria ...	1	2	1	1	—
Littlehampton—Hove—Victoria ...	1	1	1	1	—
—Horsham—Victoria ...	—	—	3	—	—
Bognor Regis—Victoria ...	2	2	3	—	—
Portsmouth Harbour—Victoria ...	—	1	1	—	—
Totals ...	16	20	25	15	11

* "Brighton Belle," Pullman cars only.

This information has been collected from the "Programme of Additional and Altered Train Services for the Easter Holidays," which was available at Southern Region enquiry offices, etc. I understand that extra trains were run which were not shown in this pamphlet, which, incidentally, was the first of its kind issued since the war.

Yours faithfully,
G. T. MOODY

The Scrap Heap

MODEL LOCOMOTIVE IN CHURCH

A model of the Gresley Pacific type locomotive, *The Flying Scotsman*, lent by British Railways, was among the exhibits in the chancel of St Jude's Church, Hexthorpe, at the first Industrial Sunday service to be held at the church, which is near the Doncaster plant of British Railways.—From "The Yorkshire Post."

WESTERN REGION SERVICE

From Traffic TG/10, 11/5/49, 4.5 p.m. To Operating Superintendent.
8.0 a.m. Penzance to Paddington was at Reading 3.43 p.m. (4E) to 4.4 p.m. (11L) due to a passenger giving birth to a baby in the rear van third, No. 3481. The van was detached and a doctor, midwife and ambulance is in attendance.

100 YEARS AGO

From THE RAILWAY TIMES, May 19, 1849

MIDLAND RAILWAY.—NOTICE is hereby given, that the EXTRAORDINARY GENERAL MEETING of the shareholders in the Midland Railway Company of the 19th day of April last, will be held by adjournment on THURSDAY, the 31st instant, at One o'clock in the afternoon, at the Company's Station in Derby, for the purpose of receiving and considering the Report of the Committee of Investigation, appointed on the said 19th day of April, to examine into and report upon the management and affairs of the Company.

Dated this 15th day of May, 1849.

By order,

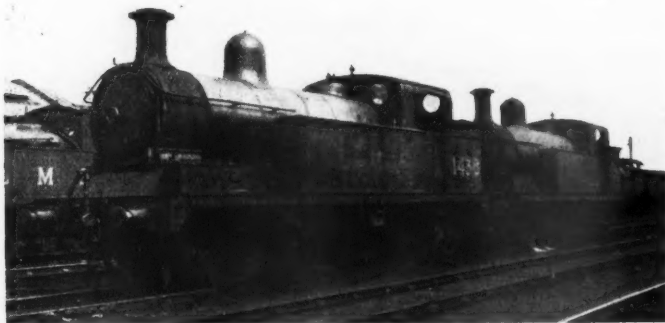
J. F. BELL, Secretary.

The Committee having stated that they will not be prepared with a report of the various matters subjected to their inquiry by the 31st instant, the meeting announced to take place as above will be held only *pro forma*, and be adjourned to a future time, of which due notice will be given to the proprietors.

LAST NORTH STAFFORDSHIRE LOCOMOTIVES

In a recent letter from Mr. R. A. Savill, our attention has been drawn to the tenth anniversary of the extinction of the North Staffordshire Railway locomotive stock, which became due at the beginning of May. Because of the war, the last two North Staffordshire locomotives, "M" class 0-4-4 tank engines Nos. 1434 and 1436, passed away very quietly, and Mr. Savill points out that pre-grouping L.M.S.R. locomotives are fast disappearing. All the North Staffordshire, Maryport & Carlisle, Glasgow & South Western engines have disappeared from service, and only a few Highland and Furness types remain, although the Midland, L.N.W.R., and Caledonian types have been more fortunate.

Last Two Representatives



The last two North Staffordshire locomotives, "M" class 0-4-4s, Nos. 1434 and 1436, at Crewe in May, 1939

Photo]

[R. A. Savill

TRANSFERRING LOCOMOTIVES BETWEEN ISOLATED LINES

Our contemporary, *Railways in Australia*, mentions cases where locomotives have to be transferred from one line to an isolated line of the same system. In Mozambique the only railway connection between the section of the Mozambique Railways based on Lourenço Marques and the isolated section between Dona Ana and Tete is by a long round-about journey over the South African, Rhodesian, Beira, and Trans-Zambesia Railways, via Pretoria, Mafeking, Bulawayo, and Dondo Junction. This 1,917 miles takes at least four days, although the direct distance is only 650 miles.

Before the direct line from Sydney was completed, the New South Wales Railways transferred locomotives from Sydney to Broken Hill (699 miles direct) over four different railways, with a total distance of 1,408 miles. The alternative was shipment to Port Adelaide, thence by rail to Broken Hill.

PASSENGER CONSCIOUS

Something has come over the railway I use every day.

For some time the New Haven Company [New York, New Haven & Hartford Railroad] has done everything a railway can be expected to do. It has run its trains on time and provided its passengers with luxurious seats in air-conditioned carriages.

But suddenly it is becoming the season ticket-holder's big brother. It runs special trains to Broadway, booking the theatre tickets as well as the railway tickets for us.

It is installing banks at all its suburban stations, and they are open from 7 a.m. as a convenience for suburbanites. It will book an hotel room for us.

At some inconvenience to itself, it has given up running its trains on standard time while New York is on summer time, because "the passengers have suffered from this confusion long enough."

And finally, the railway is circularising us to ask if there are any changes we would like in the timetables.

Behind all this is an 83-year-old French-Canadian, Frederic Dumaine, who has just acquired control of the railway. He has an unusual ambition for his railway.

Says he: "Before I get too old for hard work I want to do something good for the people."—C. V. R. Thompson in the "Daily Express" (writing from New York).

This Summer TRAVEL BY THROUGH TRAIN THERE AND BACK

from
BIRMINGHAM
AND AVOID CROSSING LONDON



British Railways poster advertising through services to be introduced on May 23, to principal South Coast resorts from Margate in the east to Penzance in the west

"LAND OF OPPORTUNITY"

Mr. James Callaghan, Parliamentary Secretary to the Ministry of Transport, at Shiremoor, Northumberland, said the Government had got nearer the Socialist aim of equality of opportunity than we have ever been in Britain. With full employment the country held great opportunities for young people.

In industry, in the colonial development scheme, in the armed forces, and in other directions, young people with ability and courage had openings on a bigger scale than ever. It is not ability that was being cramped in Labour Britain; what had been restricted was the part played by influence, wealth, and family connections in getting a place in the world.—From "The Manchester Guardian."

[Is there no influence now—political or co-operative? Are there no "jobs for the boys?"]

BRITISH RAILWAYS TIMETABLES

Last year, in an editorial footnote to a correspondent's letter we drew attention to an anomaly in British railway timetables, in that Bradshaw cost 5s. whereas the six Regional timetable books published by British Railways cost in all only 2s. 3d. (6d. each for the Southern, Western, and London Midland, and 3d. each for the Eastern, North Eastern, and Scottish books). We suggested that the price of Bradshaw should be reduced or that of the Regional books raised. The latter course has been followed, for beginning with the May issue, the cost of regional timetable books has been increased to 5s. for the complete set. The Scottish and the North Eastern books now cost 6d. each and the other four 1s. each. It will be seen that the Eastern Region book is four times its previous price. Is the extra ninepence, we wonder, the cost of including the Tilbury section pages?

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Traffic Features

During the period April to November, 1948, 37,344,340 tons of goods were transported. This represents an increase of 1,802,293 tons over the figure for the corresponding period in 1947.

Coal output from the collieries for the four weeks ended January 29, totalled 1,883,647 tons, 37,772 tons more than in January, 1948. Of this amount 136,822 tons were shipped, as against 254,711 tons last year; 410,100 tons of imported goods were also cleared from the ports during this month.

A new express goods delivery service, for consignments of 500 lb. and under, has been begun, to serve railway users in the Reef-Pretoria-Vereeniging area. Consignments will be accepted at any point in this area for delivery at destinations the next morning. In areas served by cartage services this traffic will receive priority over all other goods except perishables; in areas not served by cartage services, in addition to expeditious delivery of advice notes, consignees will be informed wherever possible by telephone of the arrival of their consignments.

In 1948, 263,316,000 gallons of petrol in bulk were moved from the ports to inland centres—33,312,000 gallons more than in 1947.

During January, 1949, 298 new wagons were placed in service, of which 154 were built by South African firms, 15 in the Railways' own workshops, and 129 imported. Of the 2,200 trucks ordered locally, 891 have now been delivered.

RHODESIA

Institute of Transport

The recently formed Rhodesia Sub-Centre of the Institute of Transport, which has a predominantly railway membership, is now conducting regular monthly meetings.

Washaways

Two major washaways, the first for some years, occurred during March, one near Pungwe on the Beira line and the other on the Bulawayo-Victoria Falls line. Both followed continuous heavy rains (at Pungwe 32-10 in. fell within five days) and showed pointedly how Rhodesia, with its rapidly expanding economy, is vitally dependent on rail transport. The first washaway immediately held up petrol sup-

plies and the second cut off coal supplies, but meritorious work on the part of the railway staff avoided a complete stoppage of road transport and output at municipal power stations.

Railway Programme

The Minister of Finance for Southern Rhodesia, in his budget speech on April 28, said that the railway programme for the next four years envisages additional capital equipment requirements amounting to about £20,000,000.

He estimated that financial results for the first year of "nationalisation" of the railways (twelve months ended March 31) is likely to yield a surplus balance of approximately £790,000 after meeting the service of loans at £1,071,500, which includes provision of £300,000 for sinking fund and after making provision for the payment of £438,100 income tax divided between the various Governments concerned. He stated: "there has been a most remarkable advance in the efficiency of the railways."

SIERRA LEONE

Railway Jubilee

Celebrations are being held this month to mark the 50th anniversary of the railway, the oldest in British West Africa. It was opened in May, 1899.

They include the issue of a jubilee book, the planting, by the Governor (Sir George Beresford Stooke), of a commemorative tree in the grounds of the railway compound, and the unveiling of a plaque on which is mounted the number plate of the first locomotive to be used on the railway. The latest locomotive to leave the workshop has been named *Jubilee*.

The main line of the 2 ft. 6 in. gauge Government railway runs from Freetown to Pendembu in the Kailahun district, 227½ miles. From Bauya Junction, 64½ miles from Freetown, a branch runs to Makeni, 82½ miles. There are 47 stations and "flag stations" (request stops).

NEW SOUTH WALES

Possible Use of 2-8-2 Locomotives

Fifty 2-8-2 freight locomotives being built by Clyde Engineering Company were originally ordered by U.N.R.R.A. for service in China. There is speculation as to their future and it is hoped that some of them may be suitably modified for service

on the N.S.W.G.R. Incidentally, it was intended to test the first locomotive of the class between Sydney and Picton.

The locomotives are similar to the existing South Australian 710 class, and develop a tractive effort of 40,400 lb. Weight in working order is 176 tons and maximum axle loading 18½ tons, making them suitable for N.S.W. main-line operation. Maximum width would have to be reduced to conform to the loading gauge.

CEYLON

Pilgrim Traffic

With the opening of the pilgrim season the railway has introduced for the first time a road-rail co-ordinated service for those going on pilgrimage to the summit of Adam's Peak, which is venerated alike by Hindus, Christians, Buddhists and Moslems.

The pilgrims are taken by rail to Hatton Station. Fleets of road buses meet each train and carry pilgrims up to Kintyre Bazaar, Maskeliya (13 miles from Hatton), which is the furthest point up to which road vehicles can operate. The rest of the journey to Adam's Peak is done on foot.

On the return journey, the pilgrims are conveyed back by buses to Hatton Station where a shelter has been erected where they may rest until train time.

A temporary booking office, open day and night, also has been opened at Maskeliya to enable pilgrims to buy return tickets for travel both by road and rail, as the normal practice on the railway is to issue tickets to cover single journey only. Tickets for travel by bus on the outward journey can be bought at any railway station at the same time the rail ticket is bought.

The road service between Hatton and Maskeliya has been organised in conjunction with the Madhyama Lanka Bus Company, which runs buses to a schedule prepared by the railway.

This service has been greatly appreciated and it has been decided therefore to provide such services as a regular feature whenever the necessity arises.

URUGUAY

Increased Pay for Employees

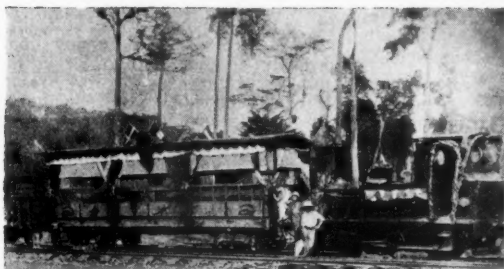
The Government has sanctioned an increase of 30 pesos per month for all employees on the recently-acquired railways.

UNITED STATES

"Cincinnati Mercury"

On April 24 the New York Central inaugurated a new Detroit-Cincinnati service, the "Cincinnati Mercury." In both directions the train is operated with full

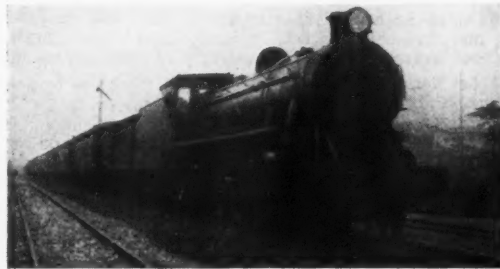
Then and Now on the Gold Coast Railway



Arrival at Obuasi of the first train from Sekondi to Kumasi on Christmas Day, 1902

Photo]

[H. C. P. Small



Kumasi-Accra train, hauled by 4-6-2 locomotive, approaching Accra

Photo]

[W. S. Darby

equipment of the Detroit-Chicago "Mercury," which is re-equipped with new stainless steel stock. The "Cincinnati Mercury" leaves Detroit daily at 11.30 a.m. and arrives at Cincinnati at 6 p.m. It departs from Cincinnati at 8.50 a.m. and reaches Detroit at 3.40 p.m. A second new train, the "Michigan," leaves Detroit at 1 p.m. and reaches Chicago Central at 5.15 p.m., calling at Ann Arbor, Jackson, Battle Creek, Kalamazoo, Niles, and Woodlawn.

SPAIN

Rolling Stock Ordered in France

The Spanish National Railways recently placed an order for 100 goods wagons valued at fr. 1,850,000,000 (approximately £1,745,000) with four French rolling stock firms, each of which will build about a quarter of the total. The four firms are: Société Lorraine, Compagnie Générale de Construction, Compagnie Industrielle de Matériel de Transport, and Entreprises Industrielles Charentaises.

FRANCE

Financial Problems

Financial problems of the S.N.C.F. are engaging the attention of the Government in connection with forthcoming parliamentary debates on the general financial situation. Ways and means of meeting the S.N.C.F. budget deficit of fr. 21,000,000,000 are under discussion. Conflict of opinions on the measures to be taken became evident after M. Pineau, Minister of Public Works & Transport, had consulted some of the chief officials.

The Minister called on M. Lemaire, General Manager, S.N.C.F., to resign. Despite compensatory advantages offered to him, M. Lemaire refused to give in his resignation and said that if he had committed any professional fault, the matter could be placed before the Conseil d'Etat (State Council). M. Lemaire further pointed out that he was in no way responsible for the financial administration of the S.N.C.F. It was announced shortly afterwards that a meeting of the S.N.C.F. Administrative Council called to consider the "replacement of the General Manager"

had been annulled. It was reported that the Minister found the members of the Council were opposed to his proposal. On May 17 M. Lemaire was replaced by M. Armand, Deputy General Manager, as Acting General Manager.

Larger Deficit Probable

Under present conditions the S.N.C.F. deficit is estimated at fr. 21,000,000,000, states the semi-official *Le Monde*, but if traffic does not improve and if the proposed reduction in some goods transport rates to meet road competition is applied, the deficit may probably exceed that figure. On the matter of immediate economies, the journal adds that the reorganisation of the S.N.C.F. is under consideration and the commission of inquiry into the subject has just published its conclusions. Reforms in view can scarcely have any immediate effect, however, and, therefore, as stipulated in the convention of 1937 for the original organisation of the S.N.C.F., Parliament would probably have to grant credits to cover the deficit.

As a counterpart to the credits, it is proposed to raise the price of petrol to obtain the necessary funds. The new price might be fr. 55 a litre, instead of the present 43 francs 20 centimes. Rationing restrictions would be lifted and petrol made easily available to the public.

The various federations of railwaymen have issued a joint communiqué protesting against press attacks on the S.N.C.F. The deficit, it maintains, is due in part to the fr. 9,000,000,000 of new taxes imposed on the railways this year, to the widening gap between receipts and expenditure, and to competition with road transport. It says that the S.N.C.F. is burdened more and more by unprofitable traffic while the "cream of the productive traffic benefits private interests."

GERMANY

Reopening of Helmstedt-Berlin Line

The first train to enter Berlin from the west since the beginning of the 327-day blockade left Helmstedt shortly before 1.30 a.m. on May 12, and after a halt of 12 min. at Marienborn, continued to Berlin (Charlottenburg).

The train, decked with festive boughs, was played out by pipes of the Gordon Highlanders. It was made up of eight coaches, in which travelled many correspondents and Sir Robert Inglis, chairman of the bipartite transport group. One part of the train had originated from Frankfurt and the other from Bielefeld.

Shortly before the lifting of the blockade the Russians insisted on carrying out an agreement of September, 1945, under which trains in their zone must be drawn by Soviet-zone locomotives. After discussion, this was agreed to, with the proviso that the western zone crew should work through, though it was stated that a protest would be registered.

Sir Robert Inglis expressed the hope that within 24 hr. the Helmstedt-Berlin line would be carrying again its daily pre-blockade supplies of 8,000 tons to Berlin; it was planned to run an average of 16 goods trains and five Allied and one German passenger trains daily.

Berlin Strike Averted

Threatened strike action by more than 3,000 West Berlin railwaymen, which would have held up the resumption of railway traffic after the lifting of the blockade has been averted by the men's union, which has recommended its members to continue work for the time being.

A communiqué from the union said that a strike had become unnecessary in view of the lifting of the blockade and the willingness of the Soviet zone railway administration to allocate western mark receipts to pay wages of West Berlin railwaymen in Western marks.

SWEDEN

New Level-Crossing Warning System

The State Railways will shortly begin to instal a new type of warning equipment at all level crossings to replace the conventional booms and permanent lights and signs now in use. The new booms have three red reflex fields and one intermittently flashing red light, making them more easily seen. Two additional red lamps are lit alternately when trains approach. The familiar "Look Out for Train" signs will be replaced by reflex boards in red and yellow.

Publications Received

Training for a Career.—An illustrated brochure issued by Tube Investments Limited describes a policy for the technical training and education of young employees. Courses for boys and youths between the ages of 15 and 19 years are provided and a day continuation school for apprentices under 17 years of age has been instituted at Oldbury. The booklet is primarily intended as a guide for parents, teachers, and others whose task it is to advise school-leavers in choosing a career.

Nickel in Non-Ferrous Castings.—The reputation established by the Mond Nickel Co. Ltd., Curzon Street, London, W.1, for service to all branches of engineering and metallurgy will be still further enhanced by the issue of this new handbook. This publication is of a size handy for the pocket and is in loose-leaf form so that sections may be added as further information becomes available. The object of the book is to provide data covering all aspects of the production, properties, and applications of various types of nickel-containing castings, and it should be of real service to founders, metallurgists, and engi-

neers in the development of new products to meet new standards and specifications. Tables giving the composition, mechanical properties, and applications of the alloys provide a wealth of data in a small compass, while other sections deal with inspection methods, founding of nickel bronzes, nickel silver foundry practice, etc. General information gives comparative shrinkages, physical constants, pouring temperatures, conversion factors, and tables. Later sections will deal with aluminium castings, high-tensile brass castings, nickel-aluminium-bronze, and bearing alloys.

Canadian National Railways Literature.—A new leaflet, "Travel in Canada and U.S.A.," summarising Canadian immigrant regulations and supplying information on travel facilities from the Canadian seaboard has been issued by the Canadian National Railways. It includes illustrations of C.N.R. equipment and opens out to form a map of the whole system, showing every station. A series of cameo leaflets on various aspects of Canadian railway procedure is being brought out. The first explains the title names given to sleeping and dining cars, the second deals with train whistles

and their meaning, and the third with personnel and their badges of service. The fourth describes the measures used by the C.N.R. to fight snow and the menace of the sub-zero winter temperatures. Other similar leaflets are to follow.

Railway Air Conditioning.—An attractive illustrated brochure, describing recent developments in train ventilation, has been issued by J. Stone & Co. Ltd., Deptford, manufacturers of the Stone-Carrier system of air-conditioning. This system, it is claimed, provides an adequate supply of properly distributed fresh air at the required conditions for comfort irrespective of climatic conditions outside the coach. The brochure is illustrated with photographs of passenger stock equipped with the Stone-Carrier system, which is now in use on the G.I.P.R., Egyptian State Railways, Malayan Railways, Iraqi State Railways, Victorian Government Railways, South Australian Government Railways, South African Railways, and the General Mitre Railway (formerly the Central Argentine Railway). The South African Royal Train, used during the 1947 tour, is air-conditioned throughout by the Stone-Carrier system.

Operating Characteristics of Multiple-Unit Trains

Higher power-to-weight ratio with improved performance in comparison with steam locomotives

*By J. E. Bowler, A.M.I.E.E., A.M.I.Mech.E.**

THE improvements in services which have resulted from electrification in the Southern Region and elsewhere have been reviewed from an operating viewpoint by various authorities, notably in a paper given in 1936 before the Institute of Transport, by Mr. E. S. Cox, then Traffic Manager, Southern Railway. The general lines followed in the Southern electrification programme were described by Mr. C. M. Cock, now Chief Electrical Engineer, Railway Executive, before the Institution of Electrical Engineers in November, 1947.

From these papers it is clear that for suburban services the multiple-unit motor coach train provides operating results which are a considerable improvement on those obtained with steam locomotion. In view of the forthcoming Liverpool Street-Shenfield and Manchester-Glossop

the motor coach; while the Southern trains have two motors per motor coach, both on one bogie, arranged so that there is a motor bogie at each extremity of the train unit.

Higher Performance at Low Speeds

Considering the MC-TC-DTC arrangement as an example, and building three such units into a nine-coach train, the total tractive effort/speed curve given by the twelve motors would be as shown in Fig. 1. This curve consists of portions of two characteristics which show respectively the tractive effort/speed relationship on full field and with some field weakening. Sufficient overlap of the two portions has been shown to cover the transition from full field to weak field which is included in Fig. 2. The upper portion of the curve in Fig. 1 above about

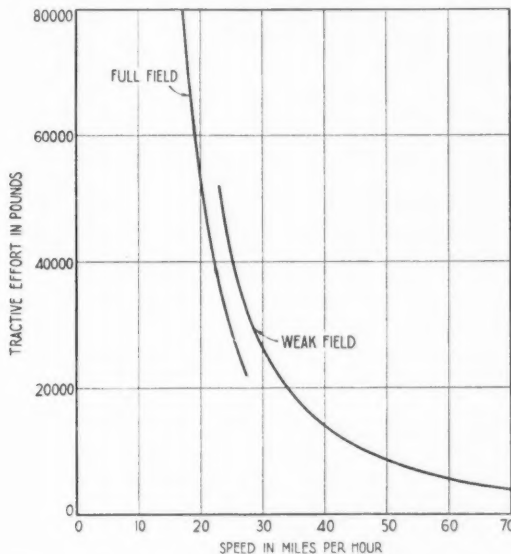


Fig. 1—Total tractive effort/speed curve for the 12 motors of a nine-coach train

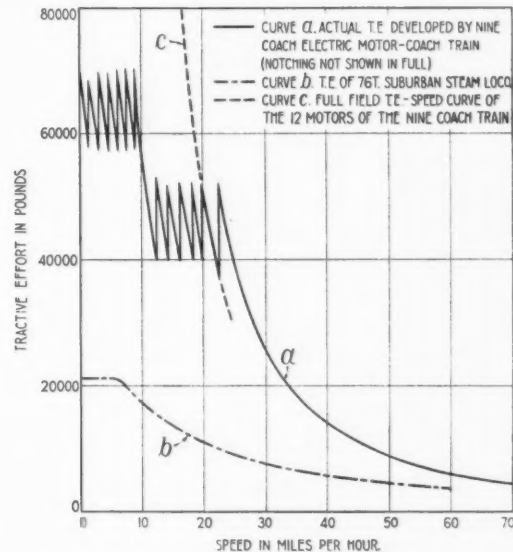


Fig. 2—Comparative tractive effort/speed curves for multiple-unit and steam trains

electrifications, it is interesting to consider the precise nature of the superiority for suburban services enjoyed by the multiple-unit electric train over steam traction.

The Motor Coach Train

It is the usual practice for suburban runs to use motor coach trains rather than trains hauled by electric locomotives. These trains are made up into units consisting of motor and trailer coaches semi-permanently coupled together, and having a driving cab at each end. Common arrangements are MC (motor coach)—TC (trailer coach)—DTC (driving trailer coach), as is proposed for the Manchester-Glossop and Liverpool Street-Shenfield electrifications; and MC-TC-TC-MC, as is common in the Southern Region. In the former arrangement there are four motors, arranged two per bogie, under

75,000 lb., and the portion beyond 70 m.p.h., are of theoretical interest only, since the automatic acceleration system employed limits the current and tractive effort, while operating considerations limit the speed.

A typical tractive effort/speed curve under automatic acceleration is shown in curve (a) of Fig. 2. Comparison with the tractive effort/speed curve of a typical suburban steam locomotive, curve (b), indicates the superior performance of the motor coach train at low speeds; a superiority which owes nothing to selected fuel or skilled driving. It might, in fact, be possible to obtain an even better performance (at the expense of passenger comfort) with a highly skilled driver if automatic acceleration were dispensed with, but from the viewpoint of the operating staff the standardised performance available with automatic acceleration is a great advantage.

With the system to be employed in the Manchester-Glossop and Liverpool Street-Shenfield electrifications, a current limit relay regulates the closing of resistance contactors in sequence up to the point corresponding to the controller position selected by the motorman. As will be seen in Fig. 2, curve (a), the relay control sets upper and lower limits to the tractive effort available, which result in smooth acceleration and reduce the possibility of wheel slip. The new electrifications mentioned above will work to an acceleration of 1.5 m.p.h./sec. until field weakening begins. The Southern Region accelerations are somewhat lower, but no doubt have been found adequate from an operational viewpoint.

Based on curves (a) and (b) of Fig. 2, an estimate has been made of the performance which might be expected on two sections of the Liverpool Street-Shenfield run, from Seven Kings to Goodmayes, a distance of nearly 4,000 ft. up a gradient of 1 in 390 (Fig. 3); and Brentwood to Shenfield (Fig. 4), a distance of 10,600 ft., of which about one-third is up 1 in 85, one-third up an average of 1 in 200, and the last third down a gradient of 1 in 136.

A study of the curves reveals several reasons for the superiority of the motor coach train. The Seven Kings-Goodmayes run is less than a mile in length, and the shorter time taken by the motor coach train is mainly due to the rapidity with which a high speed is attained as a result of the high tractive effort available. The Brentwood-Shenfield run is longer and has a severe gradient at starting; this increases the time taken to reach a high speed, both with steam and electric motive power, but the reduction in performance in the case of the steam locomotive is very much more severe than in that of the motor coach train.

The tractive effort against the gradient is about 10,000 lb., which represents approximately 50 per cent. of the steam locomotive T.E. at starting, whereas it represents only about 15 per cent. of the motor coach T.E. The remaining tractive effort is available for acceleration and to

* Traction Department, General Electric Co. Ltd.

overcome train resistance; and apart from reducing the acceleration of the steam-hauled train very materially, this lowered T.E. gives the steam train a very low balancing speed on this gradient.

The steam locomotive curve of Fig. 2 is for a 76-ton two-cylinder suburban locomotive. The run curve Brentwood-Shenfield with this locomotive takes 8 min.; the timetable for the present steam service shows a time of 5 min., which suggests that a larger locomotive would be used. This involves extra weight in the motive power

compared with the steam locomotive is 17 tons.

Higher Thermal Efficiency

It has been calculated by Mr. C. M. Cock, from experience in the Southern Region, that 1 ton of weight saved on a motor coach train represents a saving of 4 tons of coal a year on a basis of 75,000 miles running annually. And, in view of the advantage in thermal efficiency of a power station and electric transmission over the steam locomotive, the saving

weight is used for adhesion, i.e., about 110 tons for a nine-coach train. This may be reduced to some extent by weight transfer, but, combined with the high tractive effort, it enables an acceleration of 1.5 m.p.h. per sec. to be obtained up to about 27 m.p.h. The initial acceleration of the steam locomotive on the level with a nine-coach train would be 0.45 m.p.h. per sec.; the average up to 15 m.p.h. would be 0.35 m.p.h. per sec.; and up to 25 m.p.h. would be 0.25 m.p.h. per sec.

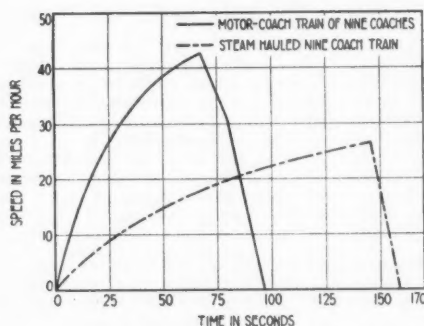


Fig. 3—Calculated performances of multiple-unit and steam trains from Seven Kings to Goodmayes

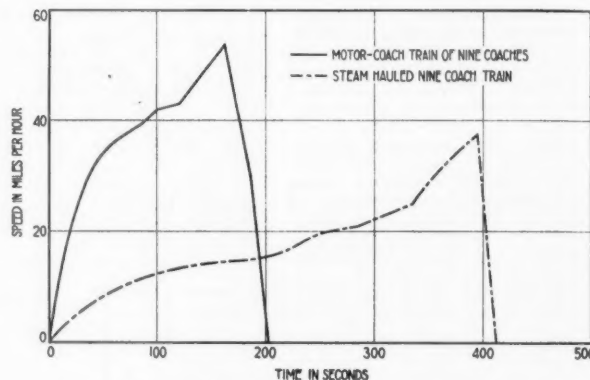


Fig. 4—Calculated performances of multiple-unit and steam trains from Brentwood to Shenfield

equipment, requiring extra tractive effort.

In this connection it is interesting to compare the weight of motive power equipment involved in the nine-coach motor coach train, MC-TC-DTC, on which the above estimates are made with the 76-ton steam locomotive. The electrical equipment in each motor coach would weigh about 14 tons. Each trailer would have about $\frac{1}{2}$ ton of equipment and each driving trailer about one ton of equipment. The total weight of electrical equipment amounts to approximately 47 tons for the nine-coach train, to which must be added the extra strengthening of the rolling stock to take this equipment—perhaps another 12 tons. The difference

compared with steam is probably almost twice as much. On the foregoing basis, the extra 17 tons on the steam locomotive mentioned above will involve 136 tons of extra coal a year. Steam locomotive power, to give a performance equal to that of the electric train on short runs, would weigh some 200 tons, or 141 tons more than the electrical equipment. This extra weight costs energy to move and is uneconomic.

Pursuing the comparison with the 76-ton steam locomotive, it will be realised that improved adhesion is obtained with the motor coach train, since there are 12 motors each driving one axle, and therefore more than one-third of the train

Since the electric train units are semi-permanently coupled and the power/weight ratio therefore remains practically constant for all lengths of train, the acceleration and performance estimated previously will be obtained also irrespective of train length. This, together with the provision of automatic acceleration, ensures uniformity of performance and makes the calculations of the operating staff much more certain. Since the successful operation of suburban services depends on very close and accurate train timings, it is clear that this uniformity reinforces the powerful appeal of electric train performance in the solution of suburban traffic problems.

ELECTRIFICATION PROGRESS IN BRAZIL.—The electrification of a further section of the Central Railway between Japeri and Barra de Pirai has now been concluded. The official inauguration took place on March 29 and was attended by the President of the Republic, and the Superintendent of the Central Railway. The section includes some 92 km. of route line and a further 10 km. of siding accommodation. Some fifteen tunnels have had to be widened or have the track lowered in them to allow the passage of the large electric locomotives used on this service, and important alterations have taken place in the permanent way to facilitate installation of overhead equipment. Electric sub-stations have been built at Caramujos, Sheid, and Barra de Pirai, and sectioning units at Austin, Japeri, Mario Bello, Humberto Antunes, and Morsing. Fifteen electric locomotives operate the goods and passenger services not only of the Sao Paulo but also of the Minas trains up to Barra de Pirai, where diesel locomotives take over. Twenty-one of the

32 diesel locomotives which have been hitherto in service on this section have been transferred to the Minas section. It is estimated that with this extension of electrified transport on the Serra do Mar an economy of some Cr.\$31,000,000 in fuel will be effected annually, and travelling time on the section will be reduced by a considerable amount.

NEW ELECTRIC LOCOMOTIVES FOR THE PENNSYLVANIA.—Four experimental electric freight locomotives, newly designed for increased power, efficiency and flexibility, have been ordered by the Pennsylvania Railroad from the Westinghouse Electric Corporation and the General Electric Company. From this development, it is believed, will emerge the most modern and efficient electric freight locomotive yet designed, an engine fully adapted to present and future requirements. Extensive studies by the engineering staffs of the railway and the electric companies, looking toward improved freight motive power for the eastern elec-

trified areas of the railway, produced the designs for the experimental engines. Each of the new locomotives will differ in design and mechanical features, particularly as to the bogies. On completion, they will be subjected to exhaustive road and other tests to determine the locomotive best adapted to the needs of the railway and showing the greatest advance in actual performance. Westinghouse will build two 5,626 h.p. locomotives, each of two units. Each unit of one locomotive will have three four-wheel bogies, and each unit of the other locomotive will have two six-wheel bogies. General Electric will build two 5,000 h.p. locomotives, each of two units, with each unit having two four-wheel bogies. All the weight of each locomotive will rest on the driving wheels, assuring maximum tractive effort and efficiency. With each trial unit developing approximately 2,500 h.p., they may be ideally combined in the ultimate design to produce a multiple-unit locomotive of 5,000, 7,500, or 10,000 h.p. as required to meet varying loads.

Lightweight Metals in Locomotive and Rolling Stock Construction

Advantages of aluminium and light alloys in reducing mechanical stresses, eliminating corrosion, and increasing speed and pay-load

By Geo. W. McARD, A.M.I.Mech.E.

IN these days, when maximum efficiency is all-important and nationalisation of the railways is an accomplished fact, one expects to see big changes for the better in rolling stock design; particularly as a result of recent improvements in welding technique and the use of light alloys, which considerably assist designers of locomotives and other vehicles.

Locomotives.—A common fault of older designs has been that the boiler as a steam producer was unable to meet completely the cylinder demands when the machine was working in the region of full power output. The fault lay in the boiler dimen-

sions, hammer blow on the rail being reduced by between 50 and 95 per cent., depending on the design.

The proportions of all components should be made to suit the weaker material, but what may seem to some engineers to border on the impossible has been done for some years. Many components of the valve gear might be of forged aluminium, and should give almost as long a service as steel parts. Many factors have to be considered, however, when aluminium is contemplated for driving rods, and the temperature of the metal on a long run with a heavy train becomes

able degree by the conditions under which the material is required to function.

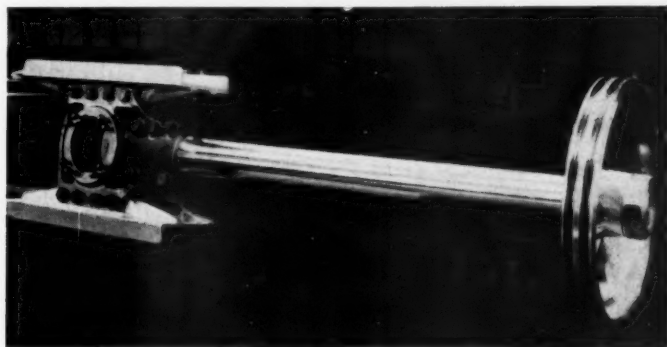
Considerable work has been done towards evolving crosshead designs combining lightweight with reliability in service, and two types of striking design are illustrated. Reference has already been made to the effect on the rail of dynamic augment—this will occur also if the wheels are too small to allow correct balancing—and heavy reciprocating parts which are unbalanced in the horizontal plane can also set up objectionable effects, especially with outside cylinders, due to nosing and swaying of the locomotive.

Alligator Crosshead

The first illustration shows an assembly of the well-known alligator type of crosshead, in which the body is formed of two halves, each forged in high dynamic steel and designed to give a more even stress distribution than in the normal steel casting or forging. Two half-plates are arranged for bolting to the slides to form a complete crosshead, and two noteworthy features are the use of Timken roller bearings for the gudgeon pin, so cutting out the usual wear of driving rod small-end brasses, and the special attachment between the piston rod and the crosshead boss to eliminate the usual cotter. Great care was taken to reduce local stress concentrations, and to ensure that each of the three annular collars on the piston rod should carry its correct share of the steam load. The gudgeon pin serves as the inner race for each of the two side roller bearings, and is a press fit in the front end of the connecting rod. The crosshead shoes are aluminium forgings of special quality, with wearing surfaces tinned with commercially pure block tin.

The crosshead is shown complete with lightweight piston and rod. The piston rod is tubular in design, the piston being produced by forging and rolling to obtain exceptionally thin sections. A narrow rim, in which the two rings are fitted, affords extreme steam-tightness and efficient service. The illustration below shows the crosshead, with one plate removed to expose the piston rod end and the inner roller bearing.

Weights of a normal assembly, together



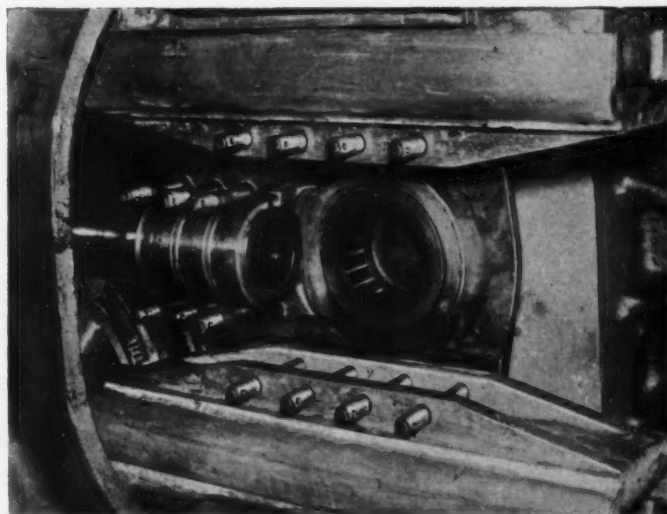
Lightweight alligator crosshead with piston and rod

sions having been restricted by the maximum permissible axle load. If, however, weight could have been saved throughout the design without excessively reducing detail proportions, a larger boiler could have been used, so enabling the cylinders to develop their full power. In other words, steam supply and steam demand at peak periods would be about equal, and, assuming correct sizes of steam supply pipes, with well designed cylinders and valves, a better power/weight ratio could have been achieved.

This problem of weight saving is an old nightmare for the designer, and with ordinary methods of construction and normal materials, little can be done about it. This, however, is where aluminium is important. Its weight is only a third of that of mild steel—their respective specific gravities are about 2.6 and 7.8—but it is less strong than steel, and the section of metal to be used, or the detail design, must take this into account. Even so, an appreciable weight can be saved, and the matter of higher cost, so often a bugbear, will be found to be more imaginary than real.

One of the most interesting parts of an engine, in considering the application of light metals, is the driving gear—crossheads, coupling and connecting rods—because of the larger savings which might be obtained indirectly as well as directly, since the wheel balance weights could be lighter because of the lower weights in motion. The saving in weight might be anywhere approaching 45 per cent. for the driving rods, and from 25 per cent. to over 50 per cent. for the crossheads. It is easy to visualise possible balance weight propor-

one possible source of trouble. Investigations are being carried out by the research departments of the makers of this valuable metal, and it is hoped that a suitable alloy may be discovered which will save weight and offer strength characteristics unaffected in any appreci-



Lightweight alligator crosshead with one plate removed and inner gudgeon pin roller bearing exposed

with those for a lightweight design of the type described, are shown below:—

	Weight of plain-bearing parts, lb.	Weight of Timken steel parts, lb.
Crosshead assembly ...	754	367
Piston, piston rod, and parts ...	765	350
Front end of main rod...	422	210
Union link and bushing	30	17
Total ...	1,971	944

It will be seen that the Timken design effects a reduction in the whole assembly of no less than 52 per cent.

claimed that, with this type of guide, neither inertia forces from the crosshead shoe nor piston-head wear can produce bending moments in the piston rod.

Oil and water tanks also lend themselves to the use of light metals and could be of much lighter design than those in service today. Where locomotive tanks form part of the coal bunkering capacity, special protection may be necessary to avoid excessive damage when coal is taken, but this is far from being an insuperable difficulty.

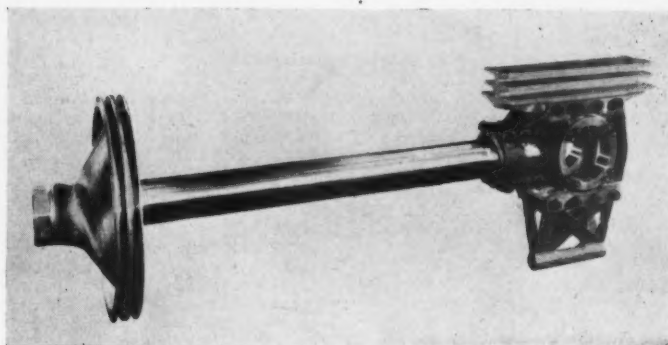
The cab, all platforms, steps and hand-rails, can be made of aluminium sections

shows the estimated weights in pounds of the parts named when made of steel, with the corresponding weights in aluminium, and the resultant saving:

	Steel	Aluminium	Saving (per cent.)
Crossheads ...	742	557	25
Valve gear ...	1,428	1,100	23
Tank brackets ...	324	164	50
Tank ...	9,800	5,390	45
Equalising pipe, etc....	98	48	50
Lubricator pipes ...	292	146	50
Footsteps and hand- rails ...	88	44	50
Platforms ...	960	480	50
Clothing sheets ...	1,200	400	67
Lagging ...	1,600	26	98
Connecting rods ...	16,532	8,355	50
Coupling rods ...	892	508	43
	784	446	43
	18,208	9,309	49

These figures show a minimum reduction of about 4 tons in an engine of 95 tons total weight in working order. Thus a saving of over 4 per cent. could be obtained in the design in question, and the reduced weight taken from the loads on the carrying bogies and trucks without affecting adhesion. A better power/weight ratio is obtained for the whole unit, and approximately four tons of deadweight saved in cost of transport throughout the life of the engine. Alternatively, the weight saved could be used to provide a larger boiler and so improve the steaming capacity of the engine.

Numerous examples are available which show the manner of reducing weight. In the famous 6-4-4-6 type Class 1 locomotive built by the Pennsylvania Railroad the exterior sheathing plates are in aluminium, while the insulation of the boiler and cylinders in Alfol weighs only 65 lb., where magnesia blocks for this purpose would have weighed 4,000 lb. A two-unit steam-electric locomotive built by General Electric for the Union Pacific Railroad has aluminium sheathing for the cab (except noseplates), hatch covers, doors, partitions, floor plates, windows, trim,



Lightweight multiple-guide crosshead with piston and rod

A crosshead with guides entirely above the cylinder centre line, and designed for Pennsylvania type multi-wear guides, is also illustrated above. Its assembly, with coned piston head, is on the lines of that shown with the alligator type of crosshead already described. Several features are common to both, but the slides are obviously different. In the second type these are formed of extruded aluminium with wearing surfaces tinned all over; it is

and plates; also the clothing sheets for boiler and cylinders, the lagging (of Alfol), and several of the general castings, such as platform supports, not subject to serious stresses. Many of the larger size nameplates, though seemingly trifling details, save generously in weight if made of aluminium. The following table is compiled from an estimate used by the writer for the design and construction of some articulated double-ended locomotives; it



Aluminium body-framing for Clark Autotram, built by Clark Equipment Company, Michigan, U.S.A.

markers, condenser shutters and frames, fans, shrouds, louvers, conduit and part of the air-brake system. The New York Central Railroad has used aluminium for some years, and in the design of their recent Niagara 4-8-4 steam engines this material was used for cabs, decks, running boards, steps, handrails, casings, sandbox and tubing, smoke deflector and conduit; a total of about 4,200 lb. of aluminium saving 6,000 lb. deadweight, excluding that saved in the crossheads, which were generally of the Pennsylvania type with multi-wear guides. Every ton saved on the total weight of the locomotive becomes an extra ton of pay-load throughout the life of the engine, and achieves a considerable financial economy as a testimony to the value of aluminium in locomotive construction.

Rolling Stock.—Aluminium is also an appropriate material for passenger coaches, in that the same amenities and degree of comfort can be obtained with a lighter total weight and, therefore, a better power/weight ratio for the complete train, affording higher average speeds. Although not standard practice, coach underframes of aluminium have given successful service. Similarly, bogie frames have been built of this material, as well as axle boxes and their guides, with suitable metals for the bearings and wearing surfaces.

Lightweight Body Structures

Body structures have been formed from aluminium sheets and sections, which are now made to any required profile by means of the press brake and suitable dies. The strength of the components, which together form the body structure, can be made equal to that of a steel unit, and still show a saving of about 50 per cent. in body weight alone. Coach furniture in ultra-modern stock is built up of tubular aluminium frames, and accessories such as window frames, doors, and bulkheads are also obtainable in the lighter alloys. Much of the metal work in kitchen and sleeping cars can be of light metals, if required.

A streamlined train built for the Louisville & Nashville Railroad has aluminium alloys for all structural parts except bolsters, crossbearers and end sills, special extruded sections being used for many of the frame members. The car exteriors embody anodised aluminium fluted extrusion and snap-on mouldings above and below the windows. Coach seats, foot-rests, parcel racks, lighting fixtures, ceilings, windows, interior finish, doors, partitions, window sashes, and a variety of smaller details are also of aluminium, resulting in a saving of 10,000 lb. in each car.

The passenger car body frame illustrated was built for the "Eagle" train of the Missouri Pacific Railroad. All structural members in the body are of aluminium alloy, and for internal finishing and furnishings aluminium plays an important part. The interior of one of the "observation parlour diners" is also shown. These cars form part of the "Southern Belle" train of the Kansas City Southern and Louisiana & Arkansas railways. The body framing for a Clark Autotram provides further evidence that considerable savings may be achieved by the use of aluminium.

Similar reductions in weight are obtainable in certain designs of wagon and tank rolling stock; one example being the 70-ton hopper cars built for the Missouri Pacific Railroad. These cars, when rebuilt with aluminium bodies, were redesigned so that the anticipated saving of 6.2 tons per car could be used to increase the payload. The hopper car

illustrated affords a clear view of the interior design. This unit was built for the Montour Railroad. Tank cars for oil and liquid chemicals are also being built of all-welded aluminium.

The cost of aluminium is frequently raised as an objection to its wider use,

of manufacture and erection. Further gains which may be considerable, are due to: (1) the fact that the painting of aluminium components is not necessary for their preservation, but is essential for most steel components; (2) the absence of porosity in light alloy castings, which is



Inner framing and doors of 70-ton aluminium hopper car built for the Montour Railroad, U.S.A.

but this objection can no longer be sustained. Today the cost of aluminium is roughly four times that of steel, but its weight is only one-third. Assuming a weight of 30 cwt. and 10 cwt. in steel and aluminium respectively, the following is a fair comparison of the material first cost:—

Aluminium unit, 10 cwt. at 4s. a lb.	...	...	£	224
Steel unit, 30 cwt. at 6d. a lb.	...	...	...	84
Difference	...	...	...	140

The difference is two-thirds more than the steel component. Admittedly, the sectional area of the aluminium product would have to be increased slightly where strength has to be considered, but this difference hardly affects the main issue, and does not always arise.

Steel scrap loses much of its weight by corrosion before it reaches the scrap merchant, but aluminium does not corrode, and maintains its weight. Ignoring the loss of steel through rust, however, and bringing in the ultimate scrap value to the above costs, the net result is as follows:—

	Steel	Aluminium
Prime cost (material only)	£ 84	£ 224
Assumed scrap value	...	...
Approximate net cost	76	194

This shows that the real extra cost of aluminium is little more than double that of steel, apart from such positive gains as lower machining costs and reduced labour charges for handling at all stages

very marked in many castings of steel or iron; and (3) the higher pay-load potentialities which the use of aluminium affords to railway operators.

I.L.O. INLAND TRANSPORT COMMITTEE.—The third session of the International Labour Organisation Inland Transport Committee opened in Brussels on May 18. The U.K. delegation consists of:—

Government:—Delegates: Mr. J. A. Diack, Assistant Secretary, Ministry of Labour; Mr. R. D. Thrupp, Transport Attache to U.K. Permanent Delegation in Geneva; Advisers: Mr. C. F. Heron, Labour Attache, British Embassy, Brussels; Mr. H. A. Meyer, Principal Officer, Ministry of Civil Aviation. (Mr. A. E. Goodbody, of the Government of Northern Ireland, accompanies the Government representatives.)

Employers:—Delegates: Mr. Frank Gilbert, Principal Staff Officer, British Transport Commission; Mr. Donald Farquhar MacDonald, Secretary, National Association of Port Employers; Advisers: Mr. G. P. Barnett, Recruitment, Training & Education Officer, London Transport Executive; Mr. J. C. Bradley, Docks Superintendent, Sharpness Docks, Docks & Inland Waterways Executive; Mr. G. Shroobree, Executive Secretary, Civil Air Transport Employers' Secretariat.

Workers:—Delegates: Mr. A. Hallworth, Acting Assistant General Secretary, Associated Society of Locomotive Engineers & Firemen; Mr. S. Henderson, National Secretary, Passenger Group, Transport & General Workers' Union; Adviser: Mr. A. Bird, National Secretary, Dock Section, Transport & General Workers' Union.

Lightweight Metals in Locomotive and Rolling Stock Construction



Aluminium-alloy body framing for the "Eagle" train, Missouri Pacific Railroad



Interior of "Southern Belle" observation-dining-parlour car, Kansas City Southern and Louisiana & Arkansas railways. These cars are built of aluminium alloy

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Bus Maintenance at Aldenham Rail Depot

Repairs to post-war and special types of road vehicle transferred from Chiswick as an emergency measure

THE London Transport Aldenham Depot, built in 1939 for the maintenance and overhaul of railway rolling stock on the Northern Line, has now come into full operation as a temporary bus maintenance works, an emergency measure necessitated by the fact that half the fleet of buses and coaches is over age, and the work to keep them on the road has increased greatly. In addition, Chiswick works has insufficient space to accommodate the large numbers of vehicles awaiting overhaul or repair.

Aldenham Depot is near the intended terminus of the Northern Line extension to Bushey Heath, and is without rail connection until such time as London Transport receives authority to proceed with the work of prolonging the line from Edgware to Bushey Heath. During the war, Aldenham Depot was used as an aircraft factory under the London Aircraft Production Scheme, and the work of converting it to bus overhaul has entailed the demolition of a considerable number of offices, ancillary buildings, and air raid shelters. The two 15-ton gantry cranes, installed for lifting railway cars, remain in position and are now used for handling buses and other vehicles as required.

Repairs to all post-war buses in future will be carried out at Aldenham, and, to expedite bodywork repairs, a "float" of six spare bodies is being maintained there. Damaged bodies can now be detached and removed and new bodies fitted within a matter of hours, and the repaired vehicles returned to service in three days instead of from six to twelve weeks as formerly.

New vehicle deliveries are now made direct to Aldenham, where they are fitted

with destination blinds, fare boards, advertisements, and other items, and finally inspected and licensed for public service. For the latter purpose Aldenham has been equipped with a turning circle, weighbridge, and tilting machine, and the Licensing Department is now located there. Facilities have also been provided for manufacturing destination and route blinds at the site.

In addition to work on new or damaged



Railway crane in use for bus lifting

post-war buses, Aldenham is handling the maintenance of the small number of "low bridge" double-deck vehicles and under-floor-engined coaches, as well as the London Transport fleet of 600 miscellaneous vehicles, ranging from motor cycles to mobile canteens.

One of the more important tasks now being undertaken at Aldenham is the conversion of pre-war STL type buses to post-war standards as the SRT type (in outward appearance similar to the RT type), to which we made reference in our March 25 issue.

TRACTION BATTERY GUARANTEE PERIOD.—Crompton Parkinson Limited announces that all Young traction batteries for electric vehicles and industrial trucks despatched on or after March 1, 1949, will be covered by a proportional guarantee of four years instead of three years. This increase in the guarantee period is the outcome of developments resulting from research in the New Malden laboratories, improved methods and equipment and scientific quality control in the works, and prolonged investigations of batteries in service.

BELGIAN ENGINEERS INSPECT LONDON TROLLEYBUS SYSTEM.—Seven leading engineers of Belgian tramway undertakings, including the Chief Engineers of the Belgian National, and the Brussels, Antwerp, and Liège systems, inspected the London Transport trolleybus network on May 10. After touring the overhaul works and depot at Fulwell the party visited some of the busiest trolleybus terminals and points of interest to see how traffic is handled during the evening peak period. The visitors also inspected electrical equipment at the Kingston sub-station and Neasden Railway Depot.

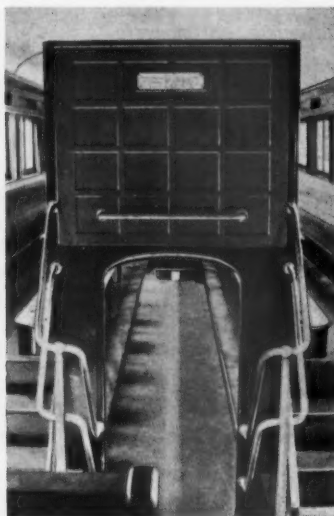


Aldenham rail depot, on the intended extension of the Northern Line from Edgware to Bushey Heath, in temporary use as a bus maintenance works

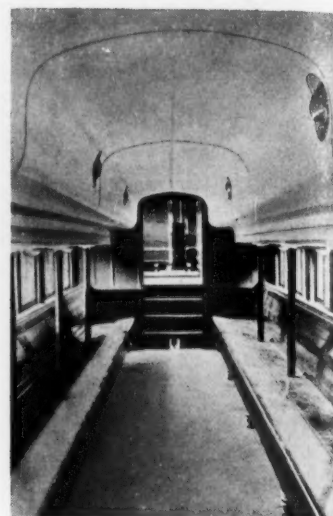
The Experimental South African Double-Deck Passenger Coach of 1927



Interior view of upper deck showing longitudinal back-to-back seating



View from end platform showing access to upper and lower decks



Lower deck with longitudinal seating under footways of upper deck

THIS experimental vehicle, which was described in our September 16, 1927, issue, was built at the Salt River works of the South African Railways in 1926, and probably was the only example of a double-deck coach on a 3-ft. 6-in. gauge railway. Headroom for the two decks was obtained by sinking the body of the coach to within 6 in. of rail level, between the bogies, and by using the space under the upper deck seats, which were arranged longitudinally, back to back, for headroom on the lower deck. The height of the gangways on the upper deck was 5 ft. 11½ in., and of the central gangway on the lower deck, 6 ft. 2 in. Seats were pro-

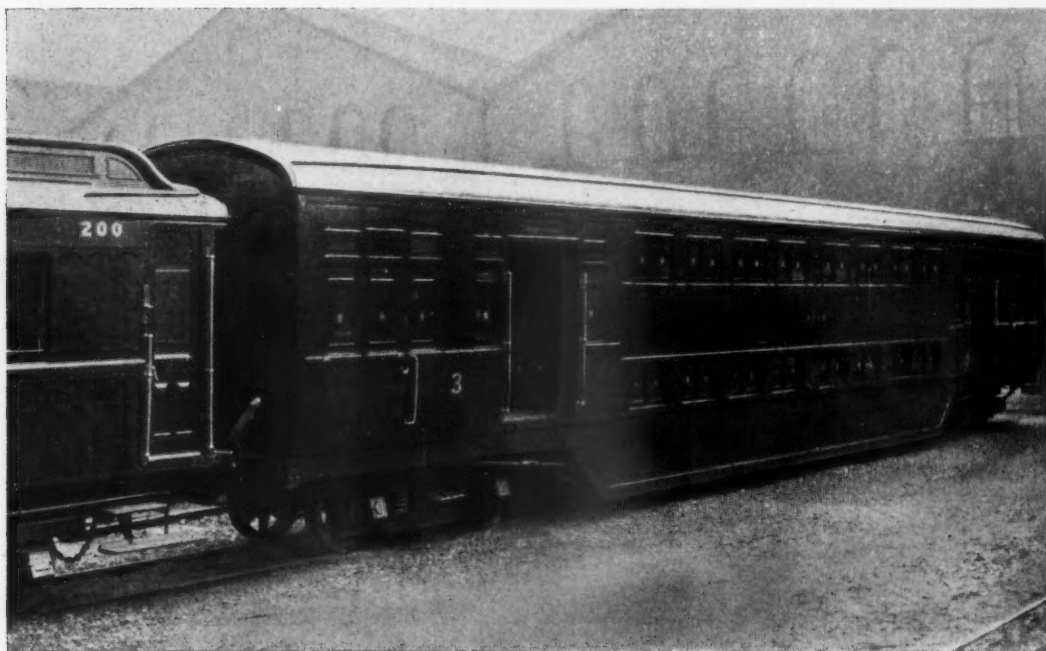
vided for 128 passengers—48 on each deck, and 16 in each of the end vestibules. Ample provision was made for peak-hour traffic, and the design allowed for nearly 50 standing passengers.

For test purposes, all available space which could be used for standing passengers was occupied, and under these extreme conditions, no fewer than 250 sitting and standing passengers were accommodated. A double sliding door, giving an opening of 4 ft., and an ordinary swing door, were provided at each end.

Tests carried out at Cape Town showed that adequate provision had been made for quick loading and unloading of pas-

sengers, in the local conditions prevailing. The overall height of the vehicle was 12 ft. 7⅝ in. (which is within the limits of the British loading gauge), and the width 9 ft. 1½ in. The overall length was 63 ft. 5 in. long, and the tare weight 30 tons 8 cwt. The coach was used for third-class native passengers in the Cape Town suburban area, but was soon withdrawn, as it proved unpopular.

An article describing a Southern Region, British Railways, design for an experimental double-deck train, together with illustrations of double-deck carriages on other railways, appeared in our March 4, 1949, issue.



General view of experimental double-deck passenger coach, South African Railways

RAILWAY NEWS SECTION

PERSONAL

The Minister of Transport has appointed Mr. B. P. H. Dickinson and Mr. C. F. Scott-Malden to be Assistant Secretaries of the Ministry, and Mr. R. S. F. Edwards to be his Principal Private Secretary. The Parliamentary Secretary to the Ministry of Transport has appointed Mr. S. E. Prior to be his Private Secretary.

Captain Hugh Vivian, M.I.Mech.E., M.I.Loco.E., who, as recorded in our

Director of Richard Garrett Engineering Works Limited since 1934, and is now relinquishing the Chairmanship of that company; he was a Director of the Great Western Railway Company from 1944 to 1947, and was Chairman of its Locomotive Committee; and he is at present a Director of Associated Electrical Industries Limited, Briton Ferry Steel Co. Ltd. (Consulting Director), and of other companies. He was recently appointed a part-time Director of the South Western Division of the National Coal Board. From 1934 to 1944

aptitude for, the problems connected with production management and control, and in 1924 was invited to join Beyer, Peacock & Co. Ltd. as Cost Accountant. He became Chief Accountant in 1926 and Comptroller in 1929. He reorganised the estimating, storekeeping, cost accounting and accounting functions; codified all the activities of the company; and installed punched-card methods, of which he was one of the pioneers in this country. In 1933 he was made Acting General Manager, and in 1934 was confirmed as



Photo

Captain Hugh Vivian

Who has retired from the Chairmanship of Beyer, Peacock & Co. Ltd.



[Lenore

Mr. Harold Wilmot

Elected Chairman of Beyer, Peacock & Co. Ltd., remaining Managing Director

April 22 issue, has retired from the Chairmanship of Beyer, Peacock & Co. Ltd., was born in 1884, and comes of a family which has been associated with the industrial development of South Wales for over 140 years, founding the Copper Works at Swansea in 1810. He was educated at Uppingham, and at the Universities of Hanover, where he studied locomotive engineering under von Borries, and of Freiburg, taking degrees in mechanical engineering and metallurgy with first class honours. In 1909 he became Technical Manager of Vivian & Sons Ltd., Swansea, of which firm he was appointed Assistant General Manager in 1918, and has been Managing Director since 1922. He has been a Director of Beyer, Peacock & Co. Ltd. since 1934, becoming Acting Chairman of that company in 1936 during the illness of Mr. Charles Burchell, and succeeding him as Chairman after his death the following year. Captain Vivian has also been a

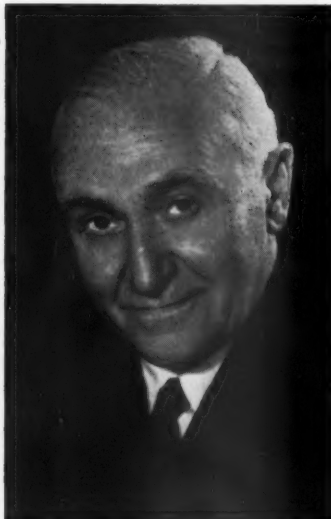
he was a Director of Metropolitan-Vickers Electrical Co. Ltd. In addition to his Membership of the Institutions of Mechanical Engineers and of Locomotive Engineers, Captain Vivian is a Member of the Institution of Mining & Metallurgy and of the Institute of Metals. He is a member of the governing bodies of the University of Wales and of the National Museum of Wales, and a member of the council of University College of Swansea.

Mr. Harold Wilmot, C.B.E., Managing Director of Beyer, Peacock & Co. Ltd., who has been elected Chairman of the company, retaining the Managing Directorship, has been President of the Locomotive Manufacturers' Association since 1947. Mr. Wilmot was born in 1895. After service in the Army for four and a half years in the 1914-18 war he joined Charles McNeil & Co. Ltd., Glasgow, and served a special post-war apprenticeship. He displayed a special interest in, and

General Manager. In the same year he became Managing Director of Richard Garrett Engineering Works Limited, with factories at Leiston, Suffolk. In 1938 he was appointed Managing Director of Beyer, Peacock & Co. Ltd. Mr. Wilmot has toured the U.S.A. and Canada, and on two occasions has visited Moscow to negotiate locomotive contracts. In 1939 he led a delegation of the Locomotive Manufacturers' Association to Turkey in connection with large locomotive contracts secured under the Anglo-Turkish Loan, and has recently made an extensive tour of South Africa and Rhodesia. For some years he was Chairman of the North Western Management Research Group, and in 1943 he became President of the Institute of Cost & Works Accountants, which office he held for three years. Mr. Wilmot was elected President of the Locomotive Manufacturers' Association in 1947. He was made a C.B.E. in the New Year Honours List this year.

**Mr. W. P. Keith**Appointed Restaurant Car Superintendent,
Hotels Executive

Mr. W. P. Keith, M.V.O., hitherto Manager, Hotels & Catering Department, Western Region, British Railways, who has been appointed Restaurant Car Superintendent to the Hotels Executive, British Transport, was born in Edinburgh in 1896 and educated at George Heriot's. He joined the Savoy Hotel, London, in 1913, and was with that company for nineteen years, except for four years during the 1914-18 war, when he served with the 1st Battalion, London Scottish, and was latterly Assistant Manager of the Savoy. In 1932 he took over the management of the Royal British Hotel, Edinburgh. Mr. Keith joined the L.M.S.R. Hotel Services in 1933, and first managed the Midland Hotel, Derby, and then the Euston Hotel. In 1935 he was appointed Assistant Hotels Controller for the Southern Area, and, in 1937, Assistant to the Hotels Controller for Inspection, etc. In 1938 Mr. Keith was made General Superintendent of Restaurant

**Mr. J. L. Meadowcroft**Appointed Area Superintendent, Eastern
Area, Hotels Executive

Car Services, and in 1945 was appointed Assistant to the Chief Hotels Superintendent, which position he held until he joined the Great Western Railway in July, 1947, as Assistant to Hotels & Catering Manager, succeeding Mr. R. A. P. Setterfield as Manager, Hotels & Catering Department, G.W.R., at the end of the same year.

Mr. J. L. Meadowcroft, who has been appointed Area Superintendent, Eastern Area, for the Hotels Executive, British Transport, with headquarters at York, entered the Hotels Department, Great Eastern Railway, Liverpool Street, in 1903, and in 1912 transferred to the Parkeston Quay Hotel, Essex. From 1914 to 1919 he was on war service, and in 1919 became Assistant Banqueting Manager, Abercorn Rooms, Liverpool Street. In 1920 he transferred to the Marine Department, Parkeston Quay, as Assistant Shore Purser, and in 1924 was appointed Victualling

**Mr. C. G. Jarrett**Appointed Area Superintendent, London &
Southern Area, Hotels Executive

Agent, Marine Department, and Hotel Manager, Parkeston Quay Hotel. Mr. Meadowcroft transferred back to the Hotels Department in 1934, and was appointed District Hotels Manager, Grimsby. Two years later he was made Hotel Manager, Royal Victoria Hotel, Sheffield, and in 1938 became Restaurant Cars Superintendent, Kings Cross (Great Northern Section). In 1942 he was appointed Assistant Hotels Superintendent for the Southern Area of the L.N.E.R., and, in 1945, Hotels Superintendent, North Eastern Area. On January 1, 1948, he became Hotels Superintendent, North Eastern Region, British Railways.

Mr. C. G. Jarrett, who has been appointed Area Superintendent, London & Southern Area, for the Hotels Executive, British Transport, joined the Great Eastern Railway at the age of seventeen in 1908, and was appointed to the Great



[Elliott]

Mr. R. B. HoffAppointed Chief Stores Officer,
Road Transport Executive

[& Fry]



[Tenser]

Mr. G. A. MusgraveMotive Power Superintendent, Western Section,
Eastern Region, British Railways,
who has retired

[Wallasey]

**Mr. S. Stevens**Appointed Divisional Engineer, Newport,
Western Region, British Railways

Eastern Hotel, Liverpool Street. Subsequently he became an Assistant to the Hotels Superintendent, and in 1925 was transferred as Manager of the Royal Station Hotel, Newcastle, L.N.E.R. He was made Manager of the Hotels Department, Southern Scottish Area, L.N.E.R., in 1935, and became Hotels Superintendent for the Scottish Area on the abolition of the Northern Scottish Area in 1939. Since January 1, 1948, Mr. Jarrett has been Hotels Superintendent of the L.N.E.R. hotels, refreshment rooms and restaurant cars in the Scottish Region of British Railways. During the 1914-18 war he served in France, Egypt and Palestine with the Royal Artillery; and in the recent war he served in the Royal Artillery, and afterwards in the Army Catering Corps.

Mr. R. B. Hoff, hitherto Purchasing Agent, London Transport Executive, who has been appointed Chief Stores Officer, Road Transport Executive, joined the Audit Office of the Underground group of companies in 1923, and was employed on general audit and cost investigations. In 1926 he moved to the Stores Department, and in 1928 was appointed Personal Clerk to the Chief Stores Superintendent. After holding various appointments within the department he became Assistant to the Chief Stores Superintendent of the London Passenger Transport Board in June, 1942. Mr. Hoff was appointed Purchasing Agent in January, 1945.

Mr. G. A. Musgrave, M.I.Mech.E., M.I.Loco.E., who has retired from the position of Motive Power Superintendent, Western Section, Eastern Region, British Railways, was educated at Penistone Grammar School, and began his railway career in 1902 as a premium apprentice at the Doncaster works of the Great Northern Railway, under Mr. H. A. Ivatt. He afterwards spent some time in the drawing office, and subsequently gained experience in the Running Department at Ardsley and Colwick depots. In 1908 he was made Assistant Shed Foreman, Kings Cross. In 1912 Mr. Musgrave was appointed by Sir

Nigel Gresley to take charge at Hatfield, and in the following year was appointed Assistant District Locomotive Superintendent at Colwick. He saw active service in France in 1917 and 1918 with the Royal Engineers, and in 1919 became Shops Manager at Doncaster locomotive repair shops. In 1925 he was made Assistant Works Manager, Doncaster, and was later appointed Works Manager, Cowlairs. In 1930 Mr. Musgrave was appointed Locomotive Running Superintendent (Scotland), and in 1938 went to the Southern Area of the L.N.E.R. as Locomotive Running Superintendent for the Western Section, continuing in that position for the Western Section of the Eastern Region from January 1, 1948.

Mr. S. Stevens, M.Sc.(Eng.), A.M.I.C.E., M.I.Struct.E., M.Inst.W., who has been appointed Divisional Engineer, Newport, Western Region, British Railways, studied civil and municipal engineering at University College, London, where he graduated with first class honours in engineering and was awarded the Vernon Harcourt Prize. In September, 1929, he entered the service of the Great Western Railway, in the Steelwork Department, Chief Engineer's Office. In 1932 he was posted to the Eastern Ports Division, South Wales, and in 1937 was appointed Resident Assistant Engineer at Port Talbot Docks. Mr. Stevens was appointed Resident Assistant Engineer, Cardiff Docks, from October, 1939, but was mobilised before he could assume that position. As a subaltern in 151 (G.W.) Railway Construction Company, R.E. (S.R.), he went to France in September, 1939, returning through Dunkirk. In January, 1941, he was posted as Deputy Assistant Director of Transportation in Egypt, with the rank of Major, and he was appointed Assistant Director of Transportation, G.H.Q., Middle East Forces (Lt.-Colonel) in October, 1941; in September, 1942, he was given responsibility for railway civil engineering works and the engineering planning of port facilities throughout the Middle East. In October, 1944, he was posted to England to become Deputy-

Director (Railway Construction), Control Commission for Germany, with the rank of Colonel, until released from military service in September, 1945. He was twice mentioned in despatches. Returning to the G.W.R., he was appointed to the Cardiff Valleys Division as Assistant Divisional Engineer, and transferred to the London Division in the same capacity in April, 1946. Mr. Stevens is a great-nephew of Samuel Laing, who was Chairman of the London Brighton & South Coast Railway for many years.

The late Viscount Portal of Laverstoke, who was the last Chairman of the Great Western Railway Company, left approximately £3,000,000.

M. Maurice Lemaire has relinquished the post of General Manager, French National Railways. M. Louis Armand, a Deputy General Manager, has been appointed Acting General Manager.

Coras Iompair Eireann announces the appointments, on the railway side, of Mr. J. J. Johnston as Assistant Chief Mechanical Engineer, and Mr. M. J. V. O'Neill as Works Manager at Inchicore.

G.W.R. (LONDON) GOLFING SOCIETY

The annual general meeting of the Great Western Railway (London) Golfing Society was held recently at Paddington, and was followed by a dinner in the Paddington Royal Hotel. The captain, Mr. C. R. Dashwood, presided, and was supported by Mr. K. W. C. Grand and all the other Chief Officers of the Western Region, with a number of former officers of the G.W.R. now transferred to the B.T.C. or one of the Executives. The occasion marked the winning by the Great Western Society in the 1948 season of the challenge cup presented by the late Viscount Portal to the Golfing Societies of the G.W., L.M.S., L.N.E. and Southern Railways in 1946 for annual competition. The trophy was handed over at the dinner by Mr. W. B. Richards, captain of the L.M.S.R. Society, holders of the cup in 1946 and 1947.

Sir Cyril Hurcomb Inspects Scottish Motor Traction Depots



Sir Cyril Hurcomb, Chairman of the British Transport Commission, recently inspected road passenger installations of the S.M.T. group in Scotland

Left to right: Mr. J. H. Brebner, Chief Public Relations & Publicity Officer, British Transport Commission; Mr. John Benstead, Deputy-Chairman of the Commission; Sir Cyril Hurcomb; Mr. James Amos, Vice-Chairman & General Manager, Scottish Motor Traction Co. Ltd.; Mr. Miles Beevor, Chief Secretary & Legal Adviser, B.T.C.; Mr. R. Beveridge, Director, S.M.T.

Increasing the Capacity of a French Main Line

Reversible working is to be introduced on a heavily trafficked section where quadrupling would have been excessively costly

To relieve traffic congestion on the South-Eastern Region line from Paris (Lyon) to Dijon, the French National Railways are planning to institute reversible working to run trains in either direction, up or down, on two double-track sections of the line under central control of signals and points between (1) St. Florentin-Vergigny and Les Laumes-Alésia, 85 km. (52½ miles), and (2) Blaisy-Bas and Dijon, 26 km. (16 miles). The French term for this method of operating is "banalisation."

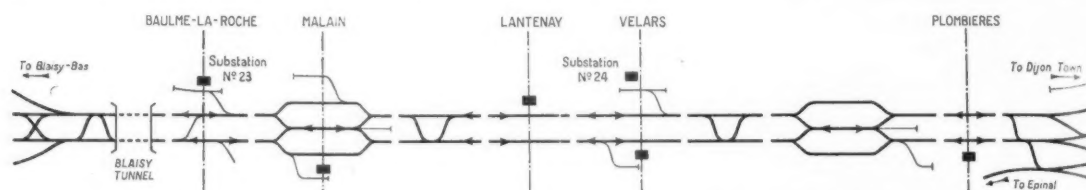
Reversible working has been used in Britain, but not to any great extent, as the particular traffic conditions for which it is mainly devised are less common than in some countries abroad. A section thus equipped was the three-track South London

Between Laroche and Dijon there is practically no line that can be used for diverting traffic. Any obstruction on a track before the passage of a succession of trains inevitably involves delays, which have far-reaching effects in causing a loss of connections for passenger trains throughout the entire South-Eastern Region. To facilitate traffic three solutions were proposed: (1) the extension of four tracks to Dijon in extremely difficult terrain, comprising a new 2½-mile tunnel at Blaisy-Bas; (2) the laying of a third "banalised" track; and (3) the "banalisation" of the two double-track sections. Solutions (1) and (2) were ruled out by the prohibitive cost and (3) retained, the cost at present prices being estimated at fr. 1,000 million.

munications allowing trains to change over at 60 km.p.h. (37 m.p.h.) will be installed approximately every 10 km. (6 miles) and sidings, available in each direction, will be laid between the double tracks. Special equipment will be provided also to enable trains to pass at suitable speeds to resume normal running at places where the double-track joins the four-track sections.

Electrical equipment of the line will be arranged in a way that will enable the consequences of any obstruction to be limited quickly to a very short section of the line.

In equipping the two double-track sections, it is proposed to deal first with the section from Blaisy-Bas to Dijon, leaving till later the St. Florentin-Les Laumes section. The technical adaptation of materials will thus be effected and tried out on the shorter section. The equipment of the longer section then can be carried out with material already tested.



The re-arrangement of tracks between Blaisy-Bas and Dijon, French National Railways

line of the former L.B.S.C.R. for some distance out of London Bridge. More important examples are found in the U.S.A.

The Paris-Dijon section has six tracks between Paris and Villeneuve-St. Georges 15 km. (8½ miles), and then four tracks, except in the above two sections, which have only double tracks. The Blaisy-Bas to Dijon section is the most difficult part of the line, with a gradient of 1 in 125 for ten miles. The heavy traffic on the line will be increased about ten per cent. after the completion of electrification now in progress by bringing in fast freight traffic at present diverted from Lyons to Paris via Moulins and Nevers, a route with difficult gradients and not adapted for running heavy and fast trains.

Both double-track sections have automatic block signalling, and to ensure safety in the changeover from one track to another, the lines will be operated between Blaisy-Bas and Dijon from a central control office at Dijon, where the controller will have sole charge of signals and points for changing over or running into sidings. This central control is expected to increase the traffic capacity by at least 10 per cent., corresponding to the increased volume of traffic when the line is electrified.

The tracks, of course, will be specially equipped to permit trains to pass from one track to the other at suitable speeds or to be run quickly into the central sidings when required to make way for faster trains following. For this purpose com-

Advantages anticipated from the improved equipment of the double tracks include increased traffic capacity of the line; limitation of the consequences of any disturbance of traffic; accelerated freight traffic with resulting economies of locomotives, rolling stock, and staff; economy in sedentary staff due to central control of switches and signals in Dijon.

Beyond Dijon the traffic congestion is relieved by the fact that these lines fan out in different directions, some carrying cross-country traffic, and others international passenger and freight trains to Switzerland via Vallorbe and via Pontarlier, Italy via Modane, and the Riviera and Italy via Lyons, Marseilles, and Ventimiglia.

DISTRIBUTORS FOR WOODHEAD-MONROE SHOCK ABSORBERS.—The firm of Jonas Woodhead & Sons Ltd., Leeds, manufacturers in this country of the shock absorber designed and patented by the Monroe Auto Equipment Company, Michigan, U.S.A., recently has appointed Gervis Components Limited, Wakeman Road, London, N.W.10, to act as sole distributors for the retail, trade, and wholesale side of this business. This arrangement will enable them to provide new Woodhead-Monroe shock absorbers with necessary conversion bracket to fit all types of vehicles. Several manufacturers in this country are already fitting these shock absorbers as standard equipment, and as soon as the new plant at Leeds comes into full operation the range will be greatly increased.

BRITISH AND FRENCH RAILWAYS TO EXCHANGE PERSONNEL.—A series of exchange visits between small groups of specially selected railwaymen of the British and French railways, to enable them to study railway technical and operating methods in each other's country, was announced recently by the

Railway Executive. Each of the groups consists of six officials, and the visit in each country lasts six weeks. In general, they are being stationed in the provinces and are studying the technical and operating subjects in which they specialise in their own country. The first British group left Victoria Station, London, by the 10.0 a.m. train on May 16. British Railway officers welcomed the first French group who arrived the same day. The British Railways employees selected for these exchange visits are being drawn from junior officers and senior trainees. Sir Eustace Missenden, Chairman of the Railway Executive, met the first group on May 11.

STANDARD STATION SIGNS FOR BRITISH RAILWAYS.—Recently the Railway Executive has decided on standard signs to be used at British railway stations. All lettering will be of the Gill Sans type on a background of the Regional colour, and all signs will consist of enamelled metal plates of certain standard sizes which will allow ample areas of background and give a high degree of clarity to the lettering. Sign boards of the new design will be provided gradu-

ally as stations undergo periodical renovation. Large signs bearing the station name in 12-in. letters are to be fixed at the incoming ends of platforms at all stations on main trunk lines and at principal stations on subsidiary lines. Smaller name signs will be displayed at intervals along the platforms in such a position as to ensure that one is easily visible from any point on the near side of a train standing at the platform. These signs will be 3 ft. long and have letters normally 3 in. high. Other standard signs on similar lines have been designed to cover every title that is used on railway stations.

GLENFIELD & KENNEDY LIMITED.—The consolidated net profit of Glenfield & Kennedy Limited, hydraulic and general engineers, for the period to December 31, 1948, amounted to £221,290. The profit figure includes £46,005 from provisions no longer required and a non-recurrent receipt, and is arrived at after depreciation, obsolescence, and taxation. A final dividend of 15 per cent. makes 20 per cent. for the period, compared with a dividend of 10 per cent., and a bonus of 10 per cent., for 1947.

Institution of Locomotive Engineers Summer Meeting

Comprehensive programme of visits in Manchester, Rugby, and Preston between May 10 and 13

Members of the Institution of Locomotive Engineers, who attended the first annual summer meeting to be organised by headquarters since the war, assembled at British Railways Rugby testing station on May 10. The locomotive testing station, which consists of both test plant and the necessary ancillary stores, workshop, engine shed, and laboratory, was described in our October 29, 1948, issue.

The engine under test at the time of the visit was the Eastern Region 3-cylinder 4-4-0 No. 62764, which has been fitted with the Locomotive Valve Gears Company's infinitely variable poppet valve gear. The type of valve gear fitted is one having an external spiral drive from a return crank on the right hand driving wheel; this drives a transverse shaft above the three cylinders, which are in line. Inlet and exhaust cams for each cylinder are mounted on this shaft and are driven by pegs engaging in slots in the shaft. Reversing and notching up are effected by moving the transverse shaft endwise. This movement adjusts the angle of drive relative to the driving axle, due to the effect of a spiral spline.

Two inlet and two exhaust valves are provided for each cylinder, and the arrangement of the gear is such that infinite variations in cut-off for each direction of running may be obtained, while full port openings to steam are maintained down to 12½ per cent. cut-off, and full port openings to exhaust to mid gear.

It is stated that this valve gear offers an opportunity to investigate the effect on both output and fuel economy of variation of the main valve events independently of one another. For any one setting of the cams, the points of release, compression and admission, vary in a definite manner with any variation of the cut-off; each of them can, however, be separately set so that the actual range over which they vary with the cut-off can be adjusted within relatively wide limits.

There are nine settings, each of admission and release, and thirteen of compression, providing a very large number

of possible variations. For the current series of tests a selection was made of these possible variations so as to demonstrate:—

(1) What benefits arise from the use of a valve gear giving independent valve events, as compared with one having all the events inter-dependent.

(2) In what direction alteration of valve events promises maximum fuel saving.

(3) In what direction alteration in events favours maximum power development.

Members of the Institution travelling from London were provided with a special train, and these special arrangements were continued to Manchester, with a train consisting of dynamometer car, nine carriages, and a Class "5" 4-6-0 locomotive fitted with Caprotti valve gear and Timken roller bearings. This run represented a variable speed test with a service train, and members were able to visit the dynamometer car *en route*.

BRITISH CAPROTTI CLASS "5"

The locomotive was one of a batch built at Crewe in 1947-48 that generally conformed to the standard Class "5" type introduced by Sir William Stanier, and had poppet valves and valve gear of the British Caprotti type supplied by Associated Locomotive Equipment Limited. The drive is taken from the centre of the leading coupled axle and the bevel gearbox is mounted directly on the cannon axlebox. A universal shaft carries the drive forward to the cross driving gearbox, which is attached to the fabricated smokebox saddle. From this gearbox, transverse shafts with universal couplings pass out to the camboxes themselves, which are located on top of the cylinder castings.

The hardened steel cams are driven by scroll nuts mounted on a rotating scroll. The inlet cam positions are altered for notching up and reversing by moving the scroll nuts endwise along the scroll. The inlet cams are in two parts, and notching up is effected by moving them relatively to one another, the followers being

equalised between the two. The position of the exhaust cams is altered in a similar manner, but as only two positions, namely, forward and reverse, are required (exhaust events are kept constant), the exhaust cams are driven by dogs, and catches are provided to hold the cams in the desired gear until reversing is effected.

The scroll nuts are moved endwise by means of connecting rods driven by a crankshaft having throws at 90 deg. in order to give the desired differential movement of the nuts. This crankshaft emerges at the rear of the cambox and is driven from a standard type of reversing screw in the cab through a linkage and suitable reverse gearboxes.

The cam followers consist of rollers on rocker arms, which operate vertical poppet valves. These are held up against the tappets, and closed by steam actuation from the main regulator. When steam is shut off, the valves drop off their seatings and allow of free communication between both ends of the cylinder, thus giving a very effective by-pass action. The inlet valves, 6½ in. in dia., are placed on the outside of the engine, and the exhaust valves, 7 in. in dia., nearest to the smokebox. This arrangement gives a more direct passage for the exhaust steam than the more usual Caprotti arrangement.

On Wednesday, May 11, the party was the guest of the Directors of The English Electric Co. Ltd. During the morning a visit was made to the flight sheds at Salmesbury, where members inspected "Vampire" and "Lincoln" aircraft, and were entertained with a brilliant display of aeronautical acrobatics by one of the jet fighter aircraft.

At the luncheon which followed, Mr. L. H. Short, Chief of Administration, The English Electric Co. Ltd. Traction Department, said that for fifty years or more the Dick Kerr works had been associated with Preston and had enjoyed most cordial relations with that town.

The Mayor of Preston, in response, thanked the Chairman and Board of Directors for the opportunity to be present, and said that the extension of the company's works had been a great benefit to Preston during the slump. He thought he could pay the company no better compliment than hoping it would never leave Preston.



Institution of Locomotive Engineers summer meeting train conveying members from Rugby to Manchester. The locomotive is Class "5" 4-6-0 No. 44752 fitted with British Caprotti valve gear and has Timken roller bearings

Mr. Short, proposing the toast, "The Institution of Locomotive Engineers," which he coupled with the name of Colonel Rudgard, said that they had taken the Napier lead in building prototypes elsewhere and making Preston a production works. The Board had good mechanical and electrical engineers in the works, but on the railway side the accent was on traction engineers.

Colonel Rudgard, President of the Institution, who responded, thanked the Mayor for his presence at the luncheon and for the welcome he had extended. The Institution was proud of its science, and much knowledge had been gleaned at pre-war summer meetings.

The party then proceeded to the Dick Kerr works for a tour of inspection, which included the locomotive erecting shop, diesel engine erecting shop, traction motor assembly and test, traction control gear manufacture, and the "Vampire" jet-aircraft shop.

ANNUAL DINNER

The annual dinner of the Institution was held at the Midland Hotel, Manchester, on May 11. Colonel Rudgard, proposing the toast, "The City of Manchester," said that as the Institution had developed, great store had been set on the summer meetings. This first post-war meeting was a return to old times, and he thought Manchester was a wise choice as a centre for the occasion.

The Lord Mayor, in reply, expressed pleasure at the decision to hold the first summer meeting in Manchester, where they had a very great interest in locomotive building.

Mr. J. S. Tritton, a Past-President of the Institution, who proposed the toast, "The President and The Members of the Railway Executive," said it was his pleasurable duty to express thanks for the Executive's help in making the summer meeting a success, and he specially mentioned the free passes and visit to the testing station.

Colonel Rudgard, in response, thanked Mr. Tritton for his speech. He read telegrams addressed to the meeting from Mr. Cyril Williams, the President-Elect, Mr. R. A. Riddles, Member, Railway Executive, and Major Harrison, the retiring Secretary.

Colonel Rudgard, proposing the toast, "The Guests," reminded members of the excellent arrangements that had been made for their visit to The English Electric Co. Ltd. They were well aware of the contribution to Manchester's industrial prosperity which was being made by Beyer, Peacock & Co. Ltd., and also were looking forward to the visit to Metropolitan-Vickers Electrical Co. Ltd., Trafford Park works.

Replies were made by Mr. L. H. Short, for The English Electric Co. Ltd., Mr. H. Wilmot, for Beyer Peacock & Co. Ltd., and Mr. W. A. Coates, for Metropolitan-Vickers Electrical Co. Ltd.

A visit to the Gorton works of Beyer, Peacock & Co. Ltd. was made during the morning of May 12, and the tour included the steel foundry, which is equipped with the latest type of electric melting furnaces. The works are serviced by a range of scientific laboratories and test rooms, and members inspected modern industrial X-ray equipment provided to ensure the homogeneity of metals and welded structures. Beyer-Garratt and other locomotives were seen in various stages of construction, and at the conclusion of the visit, two complete locomotives were available for inspection. The party then

took luncheon at the Midland Hotel as the guests of the Directors of Beyer, Peacock & Co. Ltd. Mr. Wilmot, Chairman of the Board, presided.

During the afternoon, members visited the Trafford Park works of Metropolitan Vickers Electrical Co. Ltd., where foundry work and the assembly of a wide range of electrical equipment were seen.

On Friday, May 13, a train consisting of a Class "5X" 4-6-0 locomotive, dynamometer car, two mobile-testing units, and three passenger carriages, was available for inspection at Manchester Central Station. Subsequently, a test run was made between Manchester and Derby, the object of which was to measure the drawbar performance characteristics of the locomotive at a number of constant speeds. A description of the mobile testing plant appeared in our September 5, 1947, issue.

On arrival in Derby, the meeting officially terminated, and members for London travelled thence behind the L.M.R. main-line diesel-electric locomotive No. 10000.

Traders' Traffic Conference, Glasgow Meeting

The annual meeting of the Traders' Traffic Conference was held at Glasgow on May 10 and 11. Lieut.-Colonel Caulfield-Giles, M.Inst.T., of Newton Chambers & Co. Ltd., who, as was recorded in our issue of April 1, recently has been elected Chairman of the Conference for the ninth successive year, presided.

On the morning of May 10, members were guests of the Clyde Navigation Trust on a trip down the river, and were afterwards their guests at lunch, where they were welcomed by Mr. Barclay Hogarth, Chairman, Mr. W. E. McCaig, Vice-Chairman, Mr. John Wilson, General Manager & Secretary, Captain J. W. Eaglesome, Harbour Master & Traffic Superintendent, and other officers of the Trust. Mr. Barclay Hogarth welcomed the Conference, and Mr. W. R. Clark-Lewis, of Babcock & Wilcox Limited, replied.

In the afternoon, members were the guests of Federated Foundries Limited, Glasgow, on a coach trip to Loch Lomond, Loch Long, and Garelochhead, and in the evening the annual dinner was held at the Central Hotel, Glasgow, when Lieut.-Colonel H. R. Caulfield-Giles proposed the toast of the Clyde Navigation Trust, whom he thanked for their hospitality.

Speaking on the charges schemes to be produced by the British Transport Commission, the Chairman said that it might be wise in the national interest to distribute import and export trade over more ports. The second world war had taught them the great value of having a large number of ports available, so that in the event of damage to some, others could be brought into use. This would involve consideration of the freight rates to be charged to and from these ports, and it might well be in the interests of distribution that a trader should be able to send his goods for export to any port in the United Kingdom, whatever the distance, at the same cost; the same consideration would have to apply to import trade.

The toast was replied to by Mr. W. E. McCaig, Deputy-Chairman, Clyde Navigation Trust, who claimed that they had been reasonably successful in meeting the requirements of trade and industry. The port had proved a vital national asset. It was administered without subsidy and its war record was a very proud one.

Mr. C. M. Anderson, Transport Manager of Federated Foundries Limited, proposed the toast of the Visitors, to which Mr. J. W. Hargreaves, General Works Manager of the Renfrew and Dumbarton Works of Babcock & Wilcox Limited, replied.

The whole congress was a particularly enjoyable one, due largely to the efforts of the Conference Sub-Committee, Messrs. C. M. Anderson, W. R. Clark-Lewis, H. Hodson, and J. A. Powell.

Western Region Courses for Cartage Supervisors

As was reported briefly in our issue of May 13, on page 538, the Western Region of British Railways has inaugurated a series of courses for Cartage Supervisors aimed, primarily, at the stimulation of thought and free discussion on the various aspects of railway cartage. The first of these courses was opened at Weston-super-Mare on May 2, and, as a result of the experience gained after completion of the first course, it is expected that the methods adopted will produce most successful results.

Residential accommodation has been provided at Weston-super-Mare for the supervisors attending the courses, each of which lasts five days, and, relieved of responsibility associated with normal daily routine, they are able to devote themselves entirely to the subjects brought up for discussion in an atmosphere best calculated to produce an unfettered exchange of views and opinions.

The procedure is for a selected Western Region speaker to introduce each subject, after which the supervisors are invited to discuss the subject freely, and contribute their own views as a result of the experience gained from the adoption of practices in their own districts.

The courses are being followed with close interest at the Railway Executive and Regional headquarters, as evidenced by the recent visit of Mr. C. Furber, Commercial Superintendent, Mr. T. H. Hollingsworth, Principal Assistant to the Commercial Superintendent, and Mr. W. H. Glossop, Training & Education Officer, Railway Executive.

The syllabus of the course, which is being conducted by Mr. J. A. R. Horsley, Assistant District Freight Superintendent, Paddington, covers the following range of subjects:—

Monday.—"The Functions and Objects of Cartage Services" (Mr. H. Bolton, District Goods Manager, Bristol); "The Development of Cartage Services" (Mr. J. A. R. Horsley, Assistant District Freight Superintendent, Paddington).

Tuesday.—"Selecting the Right Type of Vehicle" (Mr. J. A. R. Horsley); "Cartage Statistics" (Mr. A. E. Wheeler, Cartage Clerk, District Goods Manager's Office, Bristol).

Wednesday.—"Uneconomic Standing Time" (Mr. J. A. R. Horsley); "Ways in which Cartage Supervisors Can Improve Efficiency" (Mr. R. G. G. Beesley, Goods Superintendent, Bristol); "Training of Motor Drivers" (Mr. F. G. Gill, Road Motor Engineer's Office).

Thursday.—"Goods Station Documentation" (Mr. J. A. R. Horsley); "The Point of View of the Road Motor Engineer" (Mr. D. W. M. Wilson, Assistant Road Motor Engineer); "Heavy Haulage and Special Contracts" (Mr. E. Thornton-Brown, Commercial Superintendent's Office).

Friday.—"Cartage Accidents" (Mr. J. A. R. Horsley); "The Claims Prevention Aspect" (Mr. L. Smith, Chief Claims Clerk, District Goods Manager's Office, Bristol); Review of the week's proceedings (Mr. H. Bolton, District Goods Manager, Bristol).

Parliamentary Notes

Railway Pensions

Sir John Mellor (Sutton Coldfield—C.), on the motion for the adjournment of the House of Commons on May 10, referred to the position of those railway pensioners drawing pensions on the pre-war scale and suffering hardship due to the rise in the cost of living. They were, he said, the salaried staffs, those employed as station-masters, goods agents, special class clerks and other senior clerks. He asked if the Minister of Transport would agree to an inquiry into their position. To simplify the matter as far as possible, he proposed to limit what he had to say to the age group which had retired before July, 1941, in which there were about 10,000 men, now all 68 years of age or older. In 1944 a slight alleviation had been made in the position of those whose pensions were less than £135 a year, otherwise the 10,000 men who had retired before July, 1941, got no cost-of-living bonus.

Supplementary cost-of-living pensions had been granted to retired Army officers with a ceiling of £600, against a ceiling of £135 for the class they were now discussing. The positions of retired Civil Servants, teachers, local government officers and other categories of Government employees had also been dealt with. He had written to the Minister, who had referred the letter to the Chairman of the British Transport Commission, Sir Cyril Hurcomb. Sir Cyril had replied, stating in the last paragraph: "Existing pension arrangements apply only to retired salaried staff and not to retired wages staff, the great majority of whom are not covered by pensions schemes. Were anything further to be done for retired railway salaried staff who already receive pensions, there would therefore be immediate difficulties with the retired wages grade staff, quite apart from the cost which would be involved in providing from the Commission's revenues supplements for the very large number of persons concerned."

GOVERNMENT'S LIABILITY

Sir John Mellor said the railway companies during the war could have done nothing to help in the matter because the railways had been taken over by the Government for a fixed rental. He submitted that, at any rate in the case of the railways, the Government had not only taken over the assets, but also the liabilities, of the companies, and should assume not only the financial, but also the moral, liabilities involved. Because the Government had converted men engaged in free enterprise into servants of a State monopoly, he did not think it should proceed to try to hive them off so that they were in a position inferior to that of other servants of the State. They should receive the same consideration as any civil servant.

Captain R. J. Gunter (South-East Essex—Lab.) said he spoke on behalf of part of the organisation catering for those men. Far from it being the case, as submitted by Sir John Mellor on February 22, that, if it had not been for nationalisation, it would have been an obligation on the former railway owners to see that those men were well treated, the matter had been taken up in 1943 and the trade unions had approached the companies as long ago as 1940. The companies had then stated that the concession would place superannuitants in a better position than Civil Servants and others. In 1944 a new Pensions Increase Act had been presented. At that time it was

argued that a new set of circumstances had arisen and that the old arguments did not apply.

He had told the House that all representations would be sympathetically treated. That statement had been communicated to the railway chairmen, but no action had been taken. It had been raised again on April 18, 1944, when the Chancellor of the Exchequer had repeated the assurance that any representations would be considered sympathetically. The companies had refused to make those representations, and therefore, he submitted, it was unfair to suggest, as had been done, that the companies could not do it before nationalisation because of Government control. In December, 1944, a limited concession had been made. On May 29, 1945, Mr. Peter Thorneycroft (Monmouth—C.) had raised the matter again, and the Minister's reply had been that supplementary allowances were already given to certain annuitants, but that the question of supplementary pensions was one for the companies; however, any representations they might desire to make regarding the position during the period of control would be given most careful consideration.

NEGOTIATIONS CONTINUED

The negotiations had proceeded after 1945. The trade union had thrown all its resources into trying to better the position. The last reply from the Transport Commission had been that it was unable to consider granting supplementary allowances to retired salaried staff until consideration had been given to the general question of the pensions scheme for those grades for whom no pensions scheme had yet been made.

Mr. Alfred Barnes (Minister of Transport), replying, said he regretted he saw no useful purpose in acceding to the request for an inquiry. All the facts were known, and had been fully considered. The only proposal made or consideration given by the late railway companies had been in 1945, when those below the minimum of £135 a year had been brought up to that level. Dealing with the moral obligation which the Transport Commission, Sir John Mellor alleged, should have taken over from the companies, as the companies had never accepted the moral obligation of his case, beyond the one concession they had given, he did not see any case for his allegation that the British Transport Commission was shirking any moral obligation.

Sir John Mellor: Surely during the material time the companies had no say in the matter, because they were under control. All the railways received was a fixed rental, which they had to distribute to their shareholders in so far as it could cover dividends. That was all.

Mr. Barnes said he did not think that could stand examination. It had been the Railway Executive Committee of that period, which consisted of the four general managers, which had gone to the Minister of War Transport, Lord Leathers, and submitted that proposal to him. It was true that under the arrangements between the Government and the railways at that time any fresh commitment had to be provided by the Minister, but the Minister did approve the only recommendation submitted to him, and if the companies had had any desire to go further in the matter there was nothing to prevent them from submitting it to the then Minister.

Therefore, the Transport Commission, in January, 1948, had inherited those

superannuation schemes, and today there were approximately 99,000 persons covered by them, and there were 32,000 drawing superannuation annuities. Everyone must recognise that those superannuation schemes were not solvent. They had not been solvent in the year before the companies had ceased to be responsible. If one took the year 1947, the payments made by the companies had amounted to £4,187,000. Of that sum, the deficiency payment which had come from current revenues of the railways had amounted to £2,452,000. It was true they had not the figures yet for 1948. It was almost certain that the deficiency the Transport Commission would have to pay to maintain existing payments would amount at least to a sum equal to that of 1947, and possibly more. They had reached the position that the railway revenue was already meeting approximately 75 per cent. of the cost of the schemes, and the general finance of the railways under the Commission's administration as he knew it today did not permit it to impose additional burdens of that character.

Mr. Barnes said he would place a different interpretation on the last sentence of Sir Cyril Hurcomb's letter. He must have in mind not only financial considerations. One could not dispute the fact that the majority of wages staffs was not covered by any pensions scheme at all. From the standpoint of equity, while no one disputed that any person existing on fixed pensions, or any kind of fixed income, was suffering direct hardship when there was a general rise in commodity prices, nevertheless, the Commission carried obligations to all its staff, and in so far as there was a deficit of £2,400,000 on current revenue of the Commission in consequence of meeting those commitments, one could see the impossibility at the present time of imposing that additional burden.

Staff & Labour Matters

N.U.R. Wage Claim

Further developments took place last week in connection with the application by the National Union of Railwaymen for a flat rate increase of 10s. a week and time-and-a-quarter payment for all time worked between noon and midnight on Saturdays. Following the meeting on May 6 between the Railway Staff Conference and N.U.R. representatives, at which the Union claim was presented, similar applications in respect of railway staff employed by the London Transport Executive and staff under the control of the Hotels Executive were heard by representatives of these two Executives on May 10 and 11.

The reply of the Railway Executive to the case submitted by Mr. Figgins, General Secretary of the N.U.R., was given by Mr. W. P. Allen, Member for Staff & Establishment, when a further meeting took place at Euston on May 17 between the Railways Staff Conference and representatives of the N.U.R. After a three-hour meeting the talks were adjourned until May 19. No statement has yet been issued.

New factors which have to be considered since the Railways Staff National Tribunal rejected the claim of the N.U.R. for a flat rate increase of 12s. 6d. per week are increases in the cost of living arising from Budget decisions and the recommendations of the Oaksey report regarding improved rates of pay and conditions of service for civic police.

Notes and News

Senior Locomotive Draughtsmen Required.—Senior locomotive draughtsmen are required in the East Midlands, experienced in the design of diesel-electric locomotives. See Official Notices on page 567.

Vacancies for Civil Engineering Technical Assistants.—Required, civil engineering technical assistants able to undertake surveys and the preparation of drawings and estimates. See Official Notices on page 567.

Sales Engineer Required.—Anti-friction bearing manufacturers have vacancy for a railway engineer, between 25 and 30 years of age, as sales engineer specialising in railway work. See Official Notices on page 567.

English Steel Corporation.—Consolidated trading profits for 1948 expanded from £1,741,850 to £2,417,840. Net profits amounted to £1,081,595 after charging £1,046,766 for taxation and crediting tax adjustments of £161,178. Dividends take £283,758, and £956,362 is carried forward. Current assets were £10,193,000, as against £9,269,000 in 1947, and current liabilities, etc., £4,945,000.

Record Dunlop Profits.—The operating profit of the whole Dunlop group for 1948 was £10,768,376 as against the adjusted figure of £9,116,933 for 1947. The Dunlop parent company made a record profit of £4,967,980, as against £4,652,506 in 1947, £2,158,876 of which has been set aside for taxation. A dividend of 12 per cent., with a bonus of 3 per cent., the same as last year, is recommended on the ordinary stock.

French Railway Exports.—An agency report from Paris states that French railway building firms are delivering the following orders: for Spain, 100 coaches from four manufacturers and ten railcars from the Renault works; for Egypt, ten locomotives, built by the Société Alsacienne de Constructions Mécaniques; for Luxembourg, six railcar trailers, by Decauville, and ten railcars by Dietrich; and for Brazil, 90 locomotives.

Season Tickets on Clyde Coast Steamers.—In addition to the Glasgow and Paisley and Clyde Coast Piers "Holiday Runabout Tickets," which are now being issued, "Any Pier" eight-day and fourteen-day season tickets on the Clyde Coast have been reintroduced. They are available between any pier and cover all sailings on the Clyde Coast maintained by the steamers of the Railway Executive, including Lochranza, Campbeltown, and Inverary, but excluding "All the Way" sailings to and from Bridge Wharf. The rates of the new tickets are 30s. for eight days and 50s. for fourteen days.

New Glasgow Booking Office.—On May 24 a new railway enquiry and booking office will be opened by British Railways, Scottish Region, at Govan Road, Glasgow, adjacent to Govan Goods Station. This office, in addition to dealing with enquiries, will handle parcels traffic, including arrangements for luggage in advance, and will also issue tickets to all points to which tickets are issued from the four main Glasgow terminals, Central, Queen Street, St. Enoch, and Buchanan Street stations. For several years before the war, the L.M.S.R. had an office in Govan, but the facilities avail-

able in the new office will be on a much more extensive scale, and should go far to ease the travel arrangements of holiday-makers.

Beira Railway Winding Up.—An extraordinary general meeting of the Beira Railway Company is to be held on May 31 for the purpose of considering and, if thought fit, passing special resolutions for winding up the company voluntarily and for the appointment of liquidators.

"The Royal Scot" Non-Stop Run.—With the beginning of the summer timetable on May 23 the "Royal Scot" will run non-stop between Glasgow Central and Euston, but this must be regarded as non-stop for traffic purposes only, as the train calls at Carlisle (Kingmoor) for change of locomotive and crew.

Another Ship for Holiday Motorists.—Because of the demand from motorists who want to take their cars abroad this summer the Southern Region of British Railways has chartered the large steamer *London-Istanbul*, with accommodation for 60 cars, to run on the Folkestone-Calais route daily from July 15 to September 18. The *Auto-carrier*, which has accommodation for 25 cars, will be transferred to the Southampton-Havre route, with occasional trips direct from Southampton to St. Malo. With the *London-Istanbul* and the *Dinard* a total carrying capacity of 130 cars a day will be provided on the Southern Region short sea routes to the Continent.

London Transport Best-Kept Stations.—Results of the annual competition for the best-kept Underground stations were announced by London Transport on May 5. The winning stations, or groups of stations, are:—

Bakerloo Line (excluding Stanmore section)	Paddington
Metropolitan and Bakerloo (Stanmore) Lines	Baker Street
Inner Circle (North side), Hammersmith and East London Lines	Aldgate
District Line (Central and Eastern)	Monument group: Monument, Cannon Street, and Tower Hill
District and Piccadilly Line (Western)	Stanford Brook group: Stamford Brook, Ravenscourt Park, Chiswick Park, and Turnham Green
Piccadilly Line (Central and Eastern)	Arnos Grove group: Arnos Grove, Bounds Green, and Southgate
Northern Line (Northern section)	Finchley Central group: Finchley Central, West Finchley, and Mill Hill East
Northern Line (Southern section)	Balham group: Balham, Clapham South, and Trinity Road
Central Line	North Acton group: North Acton, West Acton, and East Acton.

The nine stationmasters from the winning stations were congratulated on May 5 by the Operating Manager (Railways), Mr. F. G. Maxwell, who handed them silver shields which they will display in the booking halls of their stations throughout the coming year.

Continuous Running of Diesel-Electric Generators.—A report has been received by Associated British Oil Engines Limited from Cairo of the performance of four transportable diesel-electric generating sets, three of them driven by McLaren MR5 engines, which have been used during the past two years to provide power in the construction of the Kafr-el-Zayat railway bridge for the Egyptian State Railways. During that time each set has run about 8,500 hours and has given excellent service under very trying conditions. During the

period of sinking the caissons for the piers, compressed air had to be maintained continuously, so that with two caissons being sunk at a time, three out of the four sets had always to be kept running. In one case a set was kept running for six weeks continuously day and night and was stopped only to replace the oil in the sump.

Locomotive Coal Economy.—As part of the campaign to reduce its coal bill the Railway Executive is distributing to every member of the footplate staff of British Railways a small folder, "Facts About Firing Locomotives," which contains notes on the present fuel position and practical hints on the best methods of firing locomotives.

Derwent Valley Light Railway Company.—The net revenue for the year ended December 31, 1948, amounted to £6,065, compared with £3,888 for the previous year. After addition of the balance brought forward and deduction of fixed charges, £4,894 is available. The directors have recommended that dividends at 5 per cent. on the preference shares and 5 per cent. on the ordinary shares be paid, leaving a balance of £844 to be carried forward.

Osram Ivory Cold Cathode Tube.—Increased possibilities in devising cold cathode lighting schemes to suit particular colour requirements are opened up by the introduction by the General Electric Company of a new ivory cold cathode tube in the Osram range. This tube, Ivory No. 40, can be used in conjunction with gold tubes to produce a pleasing, mellow light to harmonise effectively with tungsten lighting; while the cold cathode combination alone provides a satisfactory effect when something similar to tungsten lighting is desired. The resultant quality of light can be modified by adjusting the operating conditions of the tubes, and, therefore, designers of lighting installations have at their disposal a useful range of colours with one combination of tubes. Ivory tubes in conjunction with gold have been used effectively in restaurants.

Southern Region Summer Train Services.—Many additional trains at week-ends and the re-appearance of a number of pre-war services are features of the summer timetable, which comes into operation on May 23. In all, over the service which operated last summer, 49 extra trains are booked to run daily Mondays to Fridays, 129 on Saturdays, and 34 on Sundays. A number of pre-war trains on the Oxted, East Grinstead, Tunbridge Wells, and Brighton lines will be restored, and services between London and the Kent Coast resorts improved. To meet the increased carrying capacity of the new ships, *Southsea* and *Brading*, recently introduced on the Portsmouth-Isle of Wight service, three fast trains an hour will be run between London and Portsmouth on Saturdays, with additional services in the Isle of Wight. The "Devon Belle" will again run (except Tuesdays and Wednesdays) and the "Thanet Belle," from Victoria to the Kent Coast, will run daily. By the introduction of the pre-war 10.35 a.m. Waterloo to Padstow the journey time from Waterloo to Bude will be reduced by 34 min. and to North Cornwall line stations by 50 min. In the reverse direction a saving will be made of 82 min. from Padstow and 88 min. from Bude. Other services between London and Bournemouth, the Kent Coast, and the West of England will also be accelerated. Additional long distance through services

OFFICIAL NOTICES

None of the vacancies on this page relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he, or she, is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

ANTI-FRICTION bearing manufacturers have opening for Railway Engineer, aged 25-30, as Sales Engineer specialising in railway work. Railway apprenticeship desirable. Salary according to qualifications. Reply giving details of education and experience to: Box 342, *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

THE WORK OF THE RAILWAY CLEARING HOUSE, 1842-1942. An account of the development and extent of the activities of this famous British railway institution. Paper, 9½ in. by 6 in. 24 pp. Illustrations, 2s. 6d. By post 2s. 8d. *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

ELECTRIC TRACTION ENGINEER seeks better prospects and pay. At present for over 2½ years with leading Swiss firm working out projects for diesel-electric and gas-turbine-electric locomotives. Previously 12 years senior position with large and most progressive tramways undertaking in the East, electrical, mechanical and civil. Before that, 2 years with Indian company of leading British railway brake manufacturers. Full apprenticeship in loco, shops of British railway. Exceptional languages. British, R.Sc. (Lond.), M.I.E.E., A.M.Inst.C.E., A.M.I.Loco.E. Replies treated confidentially.—Box 341, *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

RAILWAY AMALGAMATION IN GREAT BRITAIN. By W. E. Simmet. An authoritative account of the course of railway amalgamation in Great Britain up to the end of 1923. Cloth, 8½ in. by 5½ in. 276 pp. 15s. By post 15s. 7d. *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

SENIOR LOCOMOTIVE DRAUGHTSMEN required in the East Midlands, experienced in the design of diesel-electric locomotives. Men with sound steam and/or electric traction experience will be considered. Reply particulars of training, experience, and salary required to: Box 337, *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

REQUIRED: Civil Engineering Technical Assistants able to undertake surveys and the preparation of drawings and estimates. Engagement on a temporary basis at a salary of up to £9 per week, according to qualifications and experience. Applications stating age, experience, etc., with copies of recent testimonials, to Box 336, *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

THE FIRST PASSENGER RAILWAY. By Charles E. Lee. A history of the Swansea & Mumbles Railway, which extends over 136 years. Cloth, 8½ in. by 5½ in. 91 pp. Illustrated. 5s. By Post 5s. 3d. *The Railway Gazette*, 33, Tothill Street, Westminster, S.W.1.

from the North and Midlands to the Kent and South Coast resorts will be re-introduced, including the following:—

Sheffield, Nottingham, Leicester—Margate and Ramsgate (outward Friday nights, returning Saturday mornings).
Birmingham, Coventry—Brighton, Eastbourne, and Hastings (Fridays and Saturdays only in each direction).
Leicester, Northampton—Brighton, Eastbourne, and Hastings (Saturdays only in each direction).
Wolverhampton, Birmingham—Portsmouth Harbour for Isle of Wight (each weekday in each direction).
Birmingham—Portsmouth Harbour for Isle of Wight (outward Friday nights, returning Saturday mornings).
Birmingham—Bournemouth (outward Friday night, returning Saturday morning).
Cardiff—Bournemouth and New Milton (Saturdays only in each direction).

For the first time since the war seat reservations on Saturdays will be available. From Waterloo to Portsmouth seats will be reservable on one fast train an hour throughout the day, and on all other routes by the principal trains leaving London before 9 a.m. and from 2.50 p.m. onwards. Reservations will also be made on the West of England trains on Friday nights.

Cammell Laird & Co. Ltd. Reserves.—The directors of Cammell Laird & Co. Ltd. announce that approval has been given by H.M. Treasury to the capitalisation of the reserves of the company to the extent of £1,775,000 and the application of that sum in paying up in full 7,100,000 unissued ordinary shares of 5s.

each and the distribution of these shares as fully paid shares among the stockholders in the proportion of one ordinary share of 5s. in respect of each ordinary stock unit of 5s. held. Notices will be issued shortly convening an extraordinary general meeting for the purpose of giving approval to the issue.

Radar for Stranraer and Larne Steamers.—Steamers which maintain the services between Scotland and Ireland via Stranraer and Larne—the *Princess Victoria* and the *Princess Margaret*—have recently been fitted with radar equipment. The latter vessel is fitted with the Cossor type radar, which gives a maximum range of 12 miles, and the former is fitted with Kelvin-Hughes radar, with a maximum range of 27 miles. Trials carried out have proved most satisfactory and considerable improvement in the services during foggy and bad weather should result.

Northern General Transport Co. Ltd.—Mr. W. T. James, O.B.E., Chairman, stated at the annual general meeting on April 11 that 1948 had been a record year with 130 million passengers carried and 23 million miles operated compared with 110 million and 19 million respectively for the previous year. Adverse factors included delay in deliveries of new vehicles, the fuel cut in 1948, and alarming increases in capital and operating costs. Nationalisation would mean that the bus passenger

would bear losses on others of the British Transport Commission's undertakings, whereas now the company's stage carriage fares were the same as when the company was formed. Ultimate responsibility for fares policy would lie with the Minister of Transport.

Railway Benevolent Institution.—The board of the Railway Benevolent Institution at its meeting on April 26 granted annuities to 18 widows and 13 members, amounting to £579 6s. per annum; one gratuity to a widow of £5; and authorised 37 grants amounting to £305 7s. from the special benevolent fund in cases of immediate necessity. Grants made from the casualty fund during March amounted to £610.

Manila Railway Meeting.—The meeting of the Manila Railway Company (1906) debenture holders on April 28 was adjourned to May 19. It was stated that the company is keeping in close connection with those in close touch with the Philippine Government to follow up the suggestion of a visit to Manila and to fix the most suitable date. Otherwise, it was said, there was nothing to add to the circular of April 5.

Ulster Transport Tribunal Sitting.—The Northern Ireland Transport Tribunal established under the Ulster Transport Act of 1948 held its first sitting in Belfast on May 9 to discuss procedure, and adjourned to allow all interested parties to prepare their cases in relation to the Transport Authority's application for the closing of certain sections of the Belfast & County Down Railway. It was announced that the Down County Council, the main objectors to the Authority's proposal, will not oppose the closing of the Downpatrick-Ardglass section of the railway. Sir Anthony Babington, who presided, said that the Tribunal would "want to know whether the Transport Authority favours one form of transport as against another, to what extent and in what way they consider that unremunerative services should be maintained or developed at the expense of remunerative services, the relative cost of carriage by road and railway, how they propose to improve transport facilities and the best overall estimate they can make of their revenue and expenditure."

Aluminium Development Association.—At the annual general meeting on March 28 the retiring President, Mr. H. E. Jackson, said that the most striking development during the past year was the aluminium-alloy bridge opened in November at Sunderland; there had been progress in other structural uses, including railway and road vehicles; in shipbuilding useful

Window Display at South Africa House



A window display at South Africa House, London, featuring rail, road, and air transport in South Africa

basic work had been completed on the strength of structural portions of ships and on many technical questions relating to specific vessels. Research was being conducted into the possibilities of other permanent uses and untapped markets.

Re-opening of Eastern Region Office in Victoria Street.—The Eastern Region, British Railways, will re-open on May 23 the former L.N.E.R. travel office at 110, Victoria Street, S.W.1. The office will handle all railway passenger travel services, the issue of passenger tickets, and travel enquiries made by personal callers or by telephone. The telephone number will be Victoria 6366.

Institute of Transport Visit to Acton Works.—On Tuesday afternoon, May 10, a party of fifty-five members of the Southern Section of the Institute of Transport was shown over the London Transport railway overhaul works at Acton. The party, which was led by Mr. A. F. R. Carling, Chairman of the Southern Section of the Institute, was conducted round the works by Mr. A. W. Manser, Assistant Mechanical Engineer (Workshops). London Transport Executive.

Electric Engine for Newhaven Boat Trains.—As from Sunday, May 15, the Newhaven-Dieppe boat train has been electrically hauled between Victoria and Newhaven. This is the first time that a boat train has been worked by an electric engine and the coaching stock has been painted in the new standard livery of crimson lake and cream panelling. The locomotive used on the train is the third of the Southern Region "CC" type and was fully described in our March 25 issue; one of the three locomotives will work the service throughout the summer.

West Riding Automobile Co. Ltd.—By agreement between the British Transport Commission and the West Riding Automobile Co. Ltd., the books of the company are being examined with a view to securing a valuation of the undertaking with the object of its eventual sale on a voluntary basis to the B.T.C. The company was incorporated on April 5, 1905, as the Yorkshire (West Riding) Electric Tramways Co. Ltd., and adopted the present name on July 1, 1935. Tramways were abandoned in 1932, and the company owns and operates bus services with a total route mileage of about 550 in the Leeds and Wakefield districts.

Forthcoming Meetings

- May 20 (Fri.)—May 23 (Mon.).—British Railways, Southern Region, Lecture & Debating Society. Visit to France.
- May 20 (Fri.).—Railway Club, 57, Fetter Lane, London, E.C.4, at 7 p.m. "Some Suggested Improvements in Anglo-Scottish Train Services," by Messrs. M. D. Greville and H. A. Vallance.
- May 24 (Tue.).—Institution of Civil Engineers, Great George Street, Westminster, S.W.1, at 5.30 p.m. Annual general meeting.
- May 25 (Wed.).—Railway Students' Association, London School of Economics & Political Science, Houghton Street, Aldwych, W.C.2, at 6 p.m. Annual general meeting.
- May 28 (Sat.).—Railway Students' Association, London School of Economics & Political Science. Visit to *News of the World*, Bouverie Street, E.C.4, at 8.15 p.m.

Railway Stock Market

In the stock markets caution has again prevailed owing to the latest evidence of increasing competition in export markets provided by the Board of Trade figures for April. Industrial shares failed to be stimulated by another batch of good financial results, while British Funds turned uncertain again, the new Malaya Loan being at a discount of $\frac{1}{4}$ in initial dealings. Feature of markets has been strength of shares with bonus prospects. Both Vickers and Cammell Laird shares have been prominent since the abolition of the bonus tax last month. It can hardly be expected, however, that the Capital Issues Committee will permit any big rush of bonus issues, and some of the shares now being bought on bonus hopes may not provide a bonus until much later in the year, or perhaps not until 1950.

Renewed talk of pending take-over proposals drew fresh attention to Brazil rails, with Leopoldina stocks prominent, particularly the debentures, which continued to be favoured on the view that they are likely to receive par plus a full payment in respect of their interest arrears, which are substantial in some cases. Leopoldina Terminal 5 per cent. debentures were especially favoured and have advanced strongly to £100. The Terminal £1 ordinary shares have been active and higher at 2s. 6d., but they are purely a speculation, as it is difficult to assess how they would fare in a take-over pay-out. Leopoldina ordinary stock was better at 10 $\frac{1}{2}$, with the preference close on 31. In the case of the preference stock it is pointed out in the market that it would probably be worth well above the current price if it received a full payment in respect of dividend arrears; but it is feared that the pay-out claims of the ordinary stockholders would prevent a full arrears payment for the preference stock. Leopoldina 4 per cent. debentures were also higher at 95, with the 6 $\frac{1}{2}$ per cent. debentures at 134.

Great Western of Brazil shares have been active around 139s. San Paulo ordinary stock was firmer at 163, and the view persists that it would be unfair for the San Paulo additional compensation claims to remain outstanding if plans for take-over of the other Brazilian railways were completed. United of Havana 4 per cent. debentures have changed hands more actively around £4 and the 1906 debentures were £12 $\frac{1}{2}$. Antofagasta ordinary and preference were 7 $\frac{1}{2}$ and 54 respectively, and Nitrate Rails shares 65s. Manila "A" debentures showed business around 92; the preference shares were 8s. 3d. Mexican Railway 6 per cent. debentures were 86 $\frac{1}{2}$. Beira Railway bearer shares held firm at 50s. 6d., and, after a further decline, Canadian Pacific attracted buyers and rallied moderately to 17 $\frac{1}{2}$. Canadian Pacific preference stock was 67 $\frac{1}{2}$ and the 4 per cent. debentures 105 $\frac{1}{2}$.

Road transport shares showed firmness, with West Riding Automobile higher at 84s. on the news of negotiations with British Transport. There has been a strong rally to £1,850 in B.E.T. deferred stock after market talk of bonus possibilities. If the B.E.T. accounts are to include a consolidated balance sheet, the financial results may be issued somewhat later this time.

Iron and steel shares have been less active, apart from Vickers and Cammell Laird, which rose afresh to 35s. 3d. and 19s. 3d. on the 100 per cent. free share bonus announcements. Babcock & Wilcox were active around 72s. 6d. in anticipation of the annual meeting on May 31, while British Oxygen were 98s. 1 $\frac{1}{2}$ d. awaiting terms of the forthcoming new issue.

Shares of locomotive building and engineering companies have been generally well maintained. Beyer Peacock were 21s. 9d., Vulcan Foundry 22s. 6d., North British Locomotive firmed up to 21s. 3d., and Gloucester Wagon to 52s. 6d. Charles Roberts changed hands up to 136s. 10 $\frac{1}{2}$ d. Wagon Repairs 5s. shares were 20s. 4 $\frac{1}{2}$ d. and G. D. Peters 5s. shares marked 18s. 6d.

Traffic Table of Overseas and Foreign Railways

Railways	Miles open	Week ended	Traffics for week		No. of week	Aggregate traffics to date	
			Total this year	inc. or dec. compared with 1947/48		Total 1948/9	Increase or decrease
			£	£		£	£
Antofagasta...	811	8.5.49	66,270	+ 22,690	18	1,260,710	+ 283,240
Bolivar ...	174	July, 1948	\$28,960	— \$69,357	30	\$471,287	— \$301,893
Brazil ...	...	...	...	...	...	...	...
Cent. Uruguay ...	970	6.11.48	32,712	+ 2,978	18	593,105	+ 7,652
Costa Rica ...	281	Mar., 1949	38,753	+ 13,363	39	321,689	+ 29,338
Dorada ...	70	Mar., 1949	30,857	+ 11,157	13	90,570	+ 31,070
G.W. of Brazil ...	1,040	7.5.49	32,200	+ 3,900	18	707,500	+ 13,800
Inter. Ctl. Amer. ...	794	Mar., 1949	\$1,196,359	+ \$73,300	13	\$3,285,345	+ \$308,879
La Guaira ...	22 $\frac{1}{2}$	Apr., 1949	\$122,721	+ \$6,828	17	\$452,474	+ \$44,942
Leopoldina ...	1,920	7.5.49	46,070	+ 1,099	18	830,235	+ 160,961
Midland Uruguay ...	319	Sept., 1948	19,608	+ 3,123	12	67,355	+ 16,721
Nitrate ...	382	30.4.49	15,607	+ 2,575	17	139,226	+ 39,865
N.W. of Uruguay ...	113	Sept., 1948	5,686	+ 1,213	12	16,335	+ 1,989
Paraguay Cent. ...	274	6.5.49	698,138	+ \$36,275	44	\$6,562,022	+ \$1,610,009
Peru Corp. ...	1,059	Apr., 1949	233,380	+ 34,097	43	2,050,151	+ 323,588
Salvador ...	100	Feb., 1949	c311,000	+ c2,000	35	c1,439,000	+ c57,400
San Paulo ...	153 $\frac{1}{2}$	...	...	...	...	...	...
Taitai ...	156	Apr., 1949	7,915	+ 1,755	43	88,255	+ 8,175
United of Havana ...	1,301	7.5.49	\$315,459	+ \$147,325	44	\$12,522,008	+ \$4,028,617
Uruguay Northern ...	73	Sept., 1948	1,072	+ 52	12	3,308	+ 111
South & Central America							
Canadian National...	23,473	Mar., 1949	10,359,000	+ 696,250	13	28,911,500	+ 2,244,000
Canadian Pacific ...	17,037	Mar., 1949	7,722,750	+ 636,250	13	21,389,500	+ 2,000,000
Canada							
Barsi Light* ...	202	Mar., 1949	27,007	+ 4,380	52	332,682	+ 36,885
Beira ...	204	Feb., 1949	104,917	+ 6,180	22	589,461	+ 9,141
Egyptian Delta ...	607	31.3.49	20,629	+ 482	52	728,011	+ 99,573
Gold Coast ...	536	Mar., 1949	267,847	+ 57,662	52	2,651,667	+ 634,995
Manila ...	...	...	...	...	...	...	...
Mid. of W. Australia ...	277	Feb 1949	26,956	+ 5,101	35	230,008	+ 45,625
Nigeria ...	1,900	Feb., 1949	447,782	+ 51,185	44	5,211,547	+ 897,747
Rhodesia ...	2,445	Sept., 1947	643,980	+ 102,833	52	6,787,603	+ 612,938
South Africa ...	13,347	16.4.49	1,367,251	+ 63,798	2	3,329,465	+ 230,865
Victoria ...	4,774	Jan., 1949	1,509,601	+ 19,338	31	—	—
Various							

*Receipts are calculated @ 1s. 6d. to the rupee.